SOCIAL EUROPE

Supplement on NEW TECHNOLOGIES AND SOCIAL CHANGE

SPECIAL ISSUE 1983/84

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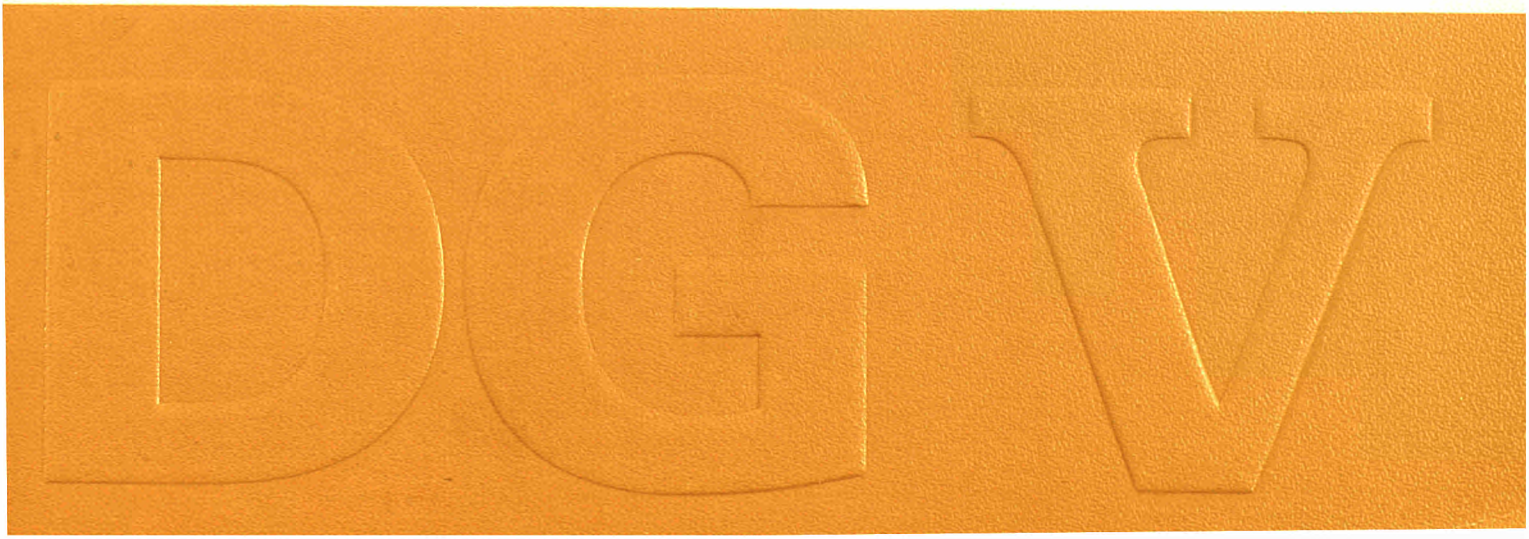
COMMISSION OF THE EUROPEAN COMMUNITIES

DIRECTORATE-GENERAL FOR EMPLOYMENT,
SOCIAL AFFAIRS AND EDUCATION



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1. EDITORIAL

The introduction of new technologies and of technological change, together with their social implications, are one of the priorities of Community action.

This was recently reaffirmed by the Standing Committee on Employment at its meeting on 10 May 1984 when it stated the need for "an overall Community response to the new industrial revolution" and recognized "the unavoidable nature of the introduction of new technologies to boost the competitiveness of European undertakings and to restore economic growth".

It also referred to the need "to utilize the potential afforded by technological innovation.... in order to create the conditions for better employment and improvement in working conditions".

On 7 June, the Council of Ministers will examine a Commission communication concerning the "social implications of the introduction of new technologies and technological change".

This, therefore, is the background to the Commission's wish to provide information, through the medium of its publication "Social Europe" and its Supplement "New Technologies and Social Change", on the action that is developing in this field at the level of the Community.

Our aim is to present, on a regular basis, dossiers of information, views and studies in the "New Technologies and Social Change" Supplement.

This first issue is a step in this direction. Your reactions and comments will help us to improve our efforts over the next few months.

J. Degimbe
Director-General

2.

PART ONE
COMMUNITY ACTION AND GENERAL INFORMATION

2.1 THE EUROPEAN SOCIAL FUND - NEW TECHNOLOGIES AND TECHNICAL PROGRESS

The object of this present article is to describe in general how the European Social Fund is used to give help in one specific area of its operation - the area of new technology and technological progress.

Future articles will describe in more detail some of the particular projects which are financed by the E.S.F.

To put the operations of the E.S.F. in this area in perspective it is necessary to give a certain amount of background information. This is to enable readers who have little or no knowledge of the E.S.F., or even of the way the Commission operates, to understand the scope and limitations of the Fund, in particular in the field of developing technology.

The E.S.F. is one of a number so-called financial instruments of the Community. These funds have money authorised through the mechanism of the Community budget for expenditure in certain fields of activity. The E.S.F. operates in the field of social affairs, and is managed by officials who work for the Directorate General for Employment, Social Affairs and Education (D.G. V). The number of officials concerned with administering the E.S.F. is just over 50.

The annual budget of the E.S.F. (in 1983 1 800 m ECU) is around 5 - 6 % of the total budget of the Community. The bulk of the funds available (at least for the moment) are earmarked for assistance to programmes addressing themselves to the needs of young people and of people in certain regions of the Community which are underdeveloped or in decline. The amount available for use in the field of technical progress in 1982 was almost 60 m ECU (about $ 50 m).

How to apply ?

Any of the ten Member States of the Community may submit applications for assistance in any of the fields in which the E.S.F. operates. Applications are made by public or private organisations. Standard applications forms have to be used. These are obtainable from designated bodies in the Member States.

The completed forms are submitted in the first place to these designated bodies (in fact government ministries), who have to authorise the application and give their undertaking that the project will be properly carried out and completed.

Priority sectors

After examination of the demands by E.S.F. officials, discussions are held with the committee of the E.S.F. This Committee is a consultative body, and consists of sixty members, six members from each Member State.

Each Member State is represented by two members from its employers' organisation, two trade union members, and two members who are government employees. Following discussions with the Committee a proposal is made for a Commission decision. The Commission decision is the act that authorises the granting of assistance.

In cases where eligible demands for assistance exceed the funds available (this is nearly always so), a system of "rationing" is used, which in Commission parlance is called a weighted reduction. This is a complex process, but means that most, if not all, eligible demands receive some assistance. A system of priorities also operates, and this is linked in with the weighted reduction system.

Now let us see how all this operates in practise. If we take the applications concerning technical progress approved in 1982 we will get an idea of the scope and limitations of this part of the E.S.F.'s activities.

Remembering that some 60 m ECU were available in 1982 for assistance in the field of technical progress, how was this money spent ?

Most of the applications came from France, Italy and the United Kingdom. They concerned :

- modernisation of management and production techniques in small and medium size enterprises
- telecommunications
- data processing
- the motor vehicle sector
- the printing sector

Many more applications were received in 1982 than in 1981. This reflects the importance attributed by promoters, public authorities, employers and workers to vocational retraining to meet the needs of technical progress. The new technologies are affecting every branch of activity to an ever greater extent. Production and management methods have to be modernised in response to a rapidly changing market.

All the applications were examined and the following priorities were considered :

First priority

- Operations contributing to safeguarding jobs in sectors of economic activity where the introduction of new technologies or production techniques jeopardized employment levels, i.e. the threat of unemployment.
- Operations encouraging the modernisation of production and management techniques in small and medium businesses.

Second priority

- Operations applying for the first time in a Member State a new technology capable of benefiting an entire sector.

- Operations in expanding areas of economic activity leading to the creation of new jobs by introducing new technologies or production techniques; the skills involved to be innovative, no suitable skilled labour to be available.

A common feature of all operations was that they involved training or retraining workers either in the same or in an entirely different field. They did not involve routine retraining - training courses had to last at least 200 hours for workers who were unemployed, or were threatened with un- or under-employment.

How then were the applications considered under these priorities ? What were the selection criteria ? The following points were taken into account :

- the characteristics of the new technology or production technique involved, and the ultimate prospects for employment.

- the nature of the modernisation measures in small and medium size enterprises.

- the branch of economic activity concerned, the situation of any particular company.

- the nature and level of the skills to be acquired.

- the employment situation of the workers involved, for example are they first time job seekers ? Are they un- or under-employed, or are they threatened with unemployment ?

The result of the examination of all the applications was as follows :

- First priority applications for operations safeguarding jobs totalled 16 m ECU
- First priority applications for operations to encourage modernisation totalled 22.5 m ECU
- Second priority applications totalled 25.5 m ECU.

First priority applications were approved in full. Second priority applications had the weighted reduction system applied as only 20 m ECU were available.

Which type of operations ?

So having followed the procedure so far, we must now explain what types of operations were involved in the various applications that were approved.

In all about 35 000 people should benefit from the following type of operation :

- Training programmes for threatened workers in the fields of :

  Micro-processors

  Telecommunications

  Industrial automation (motor vehicles, machine tools, the printing industry).

- Training programmes to promote the application of data processing techniques in the management of small and medium sized businesses.

- Conversion of machine tools to numerical control,
- Photocomposition,
- Data transmission,
- Energy conservation,
- New energy sources,
- Use of microprocessors,
- Expanding branches of economic activity in the fields of :

  Data processing

  Aerospace

  Robotics

  Electronic typewriters

  Heavy diesel engines

  Printing and mechanical engineering

  Nuclear generating stations

  High + low pressure welding

  Geophysical research

  Deep sea diving

  Radiation protection + isotope technology.

These then are the areas in which the new technology part of the E.S.F. provided assistance in 1982. It should be made clear that these are the projects approved in 1982, and that the emphasis may change from one year to another. It should also be remembered that other areas of the E.S.F. may be involved with certain aspects of technological progress, but in an indirect way. For example projects may be approved for

young people which include elements of technical progress; such projects may well be financed under the section of the E.S.F. earmarked for young people. It is often difficult to decide which area of intervention of the E.S.F. is most suitable for any given project.

A small amount of money is available each year to finance pilot projects. Such projects have to be of an experimental and innovatory character, and may concern any part of the field covered by social affairs. They are limited in duration and in the number of people who may benefit from them. Some of these pilot projects cover new technology. In 1982 the following pilot projects were approved :

- Training of engineers in energy management and composite materials
- Retraining of unemployed people as electronic data processing operators
- Training in energy conservation techniques for technicians employed by firms
- Preparation of new jobs profiles and training of staff in the renewable energy sector
- Developing of new training methods to improve ship safety in Europe
- Training of skilled workers to facilitate the application of research results in industry.

This first article dealing with the operations of the E.S.F. in the field of technical progress has necessarily been a rather dry recital and explanation of how the fund works, and what its scope and limitations are. In future articles we shall look more closely at individual projects thus putting some flesh on the bare bones.

Following the change in E.S.F. rules as from the beginning of 1984, there is now no separate budgetary line covering new technologies. However, under the new rules projects will continue to be undertaken in this field. Articles about the new rules are published in the main revue 'SOCIAL EUROPE'.

R. BETTS

2.2 NEW INFORMATION TECHNOLOGIES AND SOCIAL CONSENSUS

The leading item on the agenda of the 22nd session of the Standing Committee on Employment, held on 3 November 1981, was the problem of what impact the spreading use of new information technologies would be likely to have on society.

The Committee seized this opportunity to express its view that successful technological change was possible only if it were to be based on the broadest possible consensus of all sections of society.

The committee members, however, were less united in their opinions as to how that consensus should be achieved. The trade union representatives on the Committee wanted to see Community legislation brought in to bridge the gaps in existing national provisions. The employers' representatives, on the other hand, while recognising the need for workers to be involved in the introduction of new technologies, were opposed to the idea of binding Community rules on the matter. They felt it was best left to the individual responsibility of corporate management.

From its corner, the Commission outlined its plans to set up a tri-partite study with both sides of industry into the potential for drawing up a joint industrial declaration dealing with the problem of introducing new technologies into the workplace.

The Committee endorsed the Commission's initiative, which aimed to hammer out lines along which workers and management can work together to bring new technologies into the workplace, basing themselves on existing practises and systems in the various Member States. Some of the Member States expressed the opinion that, failing agreement on a joint declaration of this kind within a reasonable period, it would be up to the Commission to take the initiative and put forward its own set of proposals.

Round-tables in the Member States

The Commission decided that possibly the most opportune way to set this particular ball rolling was to organise a series of unofficial and informal round tables in each Member State. Each round table would be attended by a select grouping of participants from different industry sectors, and would group together specialists from both sides of industry, as well as government and independent experts. All the views expressed were to be stricly personal.

The aim of these round tables was not for the various protagonists to draw up, or entrench themselves behind, battle lines. The general view of workers and management had already been made clear in the Standing Committee on Employment, anyway. The thinking behind the scheme was to draw on the experience of the various participants in order to come

to a better understanding of how the various industrial relations systems operate. This would help clarify the industrial realities in each Member State and would form a basis for identifying the various national obstacles to a Community approach in the matter.

Three objectives were therefore set for the round tables, all deriving from the general view taken by the November meeting of the Standing Committee on Employment :

a) ask for a critical appraisal from workers and management of effectiveness of statutory provisions and collective agreements in their own country; if appropriate, ask what improvement could be made

b) sound out the willingness of both sides of industry to cooperate in the joint declaration

c) if agreement on a joint declaration proves impossible, search for guidelines for new Community initiatives.

The round tables were followed by a final report which contained both an overview of the principal views expressed at each gathering and an analytic appraisal of the various problems raised. This provided valuable guidelines for the Commission to base its subsequent work on.

The brief handed down to the Commission by the Standing Committee was to develop and define a Community approach to the rights of employees to be informed and consulted before new technologies are introduced. Naturally enough, then, this is the focus of the report's general and specific final conclusions, which I should now like to set out and comment on.

The key factor : employee involvement

It was only to be expected that one of the key concerns of the round tables, and one of the main general considerations identified by the report, was how far workers were actively involved in implementing technological innovations and the reorganization of manufacturing methods.

There are several interlocking factors deserving of emphasis here.

Firstly, while the formal machinery of participation has remained more or less unchanged, it is becoming increasingly clear that some form of adjustment must be made if it is to become more responsive to newly-emerging problems and more effective in coping with all the consequences of technological progress, including the microchip revolution. The proposals for improving or adapting the existing

formal machinery, however, did not in general seem to demand a radical overhaul of traditional industrial bargaining procedures and practices at the present time. Even proposals for new systems and processes to involve workers in decision-making remained locked firmly within the traditional bounds of labour relations.

The significance of this conclusion is aptly illustrated by two specific examples drawn from experience and current practice in Denmark and the United Kingdom. In Denmark, technology committees have been set up under specific provisions of technology agreements to evaluate the impacts of advances in existing technologies or the introduction of new ones. But, and it is an important but, these committees are firmly rooted in an established tradition of cooperation between the two sides of industry to improve working conditions. The first interindustry cooperation agreement along these lines was signed in 1947 and subsequently renewed twice - in 1964 and 1970. In the United Kingdom management and workers in many firms have set up joint consultative bodies under workplace agreements to identify and work out solutions to the various problems arising from newly-emerging skills. The precise description of these bodies varies from company to company, but they do reflect the principle of free collective bargaining which is a fundamental characteristic of industrial relations in Britain.

The second aspect is the belief voiced most frequently by the unions that the procedures for installing new technology are so complex that workers must be given a say at the decision-making stage. Progress in this area, however, seems to be hindered in many countries by problems inherent to the collective bargaining process, and, more generally, by the various stumbling blocks to a general consensus over questions of economic and industrial policy.

Thirdly, the round tables clearly illustrated that the decision to introduce new technologies was never taken in a vacuum; rather, it seems to be a dynamic, structured process, whose overall effect on the lives of workers can be appreciated only at the various levels at which those effects make themselves felt - company, plant, workshop, and work station.

In this respect, there was strong emphasis on the growing - but by no means sole - importance of the company as the forum for agreements on technology. Attempts to draw the company into the larger scheme of things (including interindustry agreements) met with varied success. Interindustry negotiations broke down in the United Kingdom. In Denmark, however, they resulted in two agreements - one applying to the private sector, the other (modelled closely on its forerunner) to public enterprises and administrations. Industrial relations in Italy tend to oscillate wildly between participation and confrontation. However, a similar trend was observed there, where Italian workers and their representatives have won the right to be kept informed about corporate investment plans. While the practical benefits of this right are exercised in the individual company, the right itself has also

been enshrined in industry-wide and sector agreements.

Most emphasis has been laid on bargaining and worker participation at company level for the simple reason that most observers are united in seeing the company as the unit able to respond most effectively and rapidly to the dynamics of changes in production technology and to the continually-developing forms of negotiation in which the line between information and consultation procedures and the strict bargaining process becomes increasingly blurred. While collective bargaining in the English-speaking world may be wholly unlike that encountered in most European countries as regards the nature and effectiveness of collective agreements, the round tables did reveal a growing trend, even in continental Europe, to see bargaining as a process. This would explain the insistence from the union side on using the force of law to oblige companies to negotiate. Also significant in this respect is the direction taken by recent legislation in France, even if it seems to have no direct bearing on the introduction of new technologies, or at least some of their more likely effects on the workers. Among the so-called "Auroux Laws" passed in 1982 was the Law of 13 November 1982 concerning collective bargaining and the settlement of industrial disputes. This obliged employers in companies with one or more union branches to hold negotiations each year on real wages, hours of work and the organization of working time.

Does national machinery work ?

The report then goes on to deal with a number of specific issues concerned with the effectiveness of the formal machinery set up in the Member countries (joint consultation committees and similar bodies, collective agreements). It also questions whether the time is ripe for action at Community level, and if so, what form it should take.

On the question of how effective legal regulations governing the various types of worker representation in companies really are, the views expressed from both sides of industry were so at odds as to make it impossible to get any objective, precise and reliable idea of the true state of affairs. A more reliable picture should emerge from the research currently being conducted by the Commission and the Dublin-based European Foundation. Based on an examination of case studies, their findings should be a valuable pointer to whether or not successful worker participation is just wishful thinking. Belgium provides a classic example here of a situation where both management and labour openly admit that a complex and highly-structured machinery, both statutory and voluntary, exists for informing and consulting workers, but cannot agree on whether it works efficiently or not.

Despite these problems, however, one fact did emerge quite clearly from the round tables : where the machinery or worker participation

is already well-established, national governments still have room for manoeuvre and initiative to improve and extend its reach. Indeed, this has already been confirmed in practice by recent legislation in a number of Member States. Yet another of the "Auroux Laws" in France, this time the Law of 28 October 1982 concerning the development of workers' representative bodies, obliges employers to inform and consult the works council before taking any major decision on the introduction of new technologies likely to affect the jobs, skills, earnings, training or conditions of work of existing employees. In the same vein, Greece's Law No. 1264/1982 of 1 July 1982 concerning the democratization of the unions and protection of union rights, also includes provisions aimed at ensuring democracy in the workplace. Here, employers are required to hold monthly meetings with union representatives at the union's request and to look for solutions to problems affecting workers or workers' organizations. The aim of the Law is to strengthen the position of the union in the workplace; but it also provides scope for both sides to get around the table to talk over the problems likely to arise out of the introduction of computer-based methods of working.

On this same question of how effective national participatory machinery really is, the unions set great store by their proposals that workers' representatives should be able to call in outside expertise at the company's expense, on the need to have trained experts in the new technologies within the union movement itself, and campaigns to increase awareness among workers.

On the issue of negotiations on new technology, the round tables emphasized the difficulties faced by collective bargaining in general at the present time, linking these in with the problems of negotiating over new technologies in particular. Such is the case in Ireland, for example, where the unions rejected an employers' proposal to link negotiations over new technologies with an agreement on the settlement of industrial disputes and wildcat strikes.

In certain cases, the principal obstacle comes from the law itself, in the sense that new technologies seem to be excluded from the accepted scope of collective bargaining, while problems may still arise when workplace agreements are being negotiated. Here again, however, national legislatures still have sufficient room to manoeuvre. The situation in Greece typifies the problems encountered in many of the Member States. In a series of judgements, the Greek Council of State has narrowly interpreted the law to exclude agreements on technology from the scope of industrial bargaining. Progress is hindered by the fact that, as the law stands, employers' organizations are empowered to negotiate industry-wide agreements, but individual managements are forbidden to negotiate company agreements.

What can the Community do ?

The Standing Committee on Employment said that if no clear guidelines emerged, then the Commission should start thinking about making proposals and taking initiatives for action at Community level. Significantly enough, however, no clear consensus emerged from the various discussions as to what the two sides of industry would like to see the Community doing, either specifically or in general terms, or even to which issues it should address itself.

What the round tables did do, though, was to enable the participants to put their personal viewpoints forward, without having to commit themselves to a policy statement for their respective organizations or departments. This produced a number of worthwhile general suggestions, not necessarily backed up by detailed proposals for financing or how they could be accomplished. These, adapted and reshaped, could serve as a basis for future Community thinking.

One suggestion was for the Commission to develop activities in further education and awareness campaigns directed towards workers on the theme of technological progress. This, however, raised the question of whether such actions fell within the scope of the Community's financial instruments - particularly the Social Fund.

Other suggestions emphasized the need to concentrate on further Research and Development and to promote the dissemination and exchange of results.

Finally a number of participants advocated actions closely linked to the themes of the round tables themselves. They wanted the Commission to step up the gathering and dissemination of information on current practice and day-to-day experience of worker participation in the introduction and use of new technology.

Present thinking of the Commission on this issue is reflected in the Commission Communication to the Council "Technological Change and Social Adjustment" (1), which will be presented in the next issue.

G. ZINGONE

(1) COM(84)6 final , 26 January 1984.

2.3 NEW TECHNOLOGIES : EFFECTS ON HEALTH AND SAFETY AT WORK

The pace of technological innovation has been increasing over the past few years in particular as a result of the introduction of certain new technologies. These technologies have brought with them important changes in the social situation as well as the development of new types of exposure which did not exist in the past. As a consequence there is a need for a greater effort to be placed on determining the effects relating to the health and safety of the working population in these new situations which to date have not been evaluated in any great detail.

The pace of technological innovation

The pace of technological innovation has been increasing over the past few years. This has been the result of the introduction of certain new technologies, in particular the advent of the microchip.

Society has been changing constantly as a result of the introduction of newer technologies which have had an impact on the structure of society with its consequent changes in the dangers to the safety and health of workers.

The recognition of cause and effect relationship for physical, chemical and biological agents at work has been at times difficult to demonstrate in the past because of the fact that new jobs and new exposures have come into being as others have ceased to exist. This is even more true today as a result of the introduction of a greater number of new technologies with their consequent changes in jobs and resultant exposures.

The rapid development and innovation of new technologies in recent years has meant that the information available on effects relating to the health and safety of the working population has not been evaluated in any great detail. In some areas it is likely that the rapid development will extend beyond our current knowledge of effects and it will, therefore, be essential to ensure that every precaution is taken to protect the health and safety of workers.

Whilst this technological revolution has resulted in the creation of whole industries, it is important to remember that existing industries have also been involved with the implementation of certain new technologies and the technological changes involved can cover a wide spectrum of activities. It is useful to divide the main problems arising from these changes into three areas.

1/ Those resulting from the introduction of technologies primarily based on the microchip :

/a - robotics

/b - visual display units

2/ Biotechnologies

3/ Other technologies of an industrial nature.

1/ The use of new technologies in particular those based on the use of the microchip has resulted in an increase in the automatisation and robotics of industrial and commercial operations. From a health and safety point of view these have had as their benefit a lightening in the physical loads involved but they may give rise to an increase in the mental loads and stress as a result. These new technologies are being introduced in more and more different situations and there is a risk that the pace of development may outrun human limitations limitations. This can be obviated to a certain extent if safety and health considerations are included at an early stage in the design of the equipment. There is a need to involve specialists in ergonomy and in machine design as well as ensuring that consultation of the workers takes place.

1/a Visual display units : The specific problem associated with work concerned with visual display units (VDU) is one that has received prominence in recent times and many studies have been carried out into the health and safety aspects of such work. Based on these studies a number of recommendations have been made concerning the health and safety conditions at the workplace.

On a wider scale the conditions of work need to be examined since the use of computers generates heat and this in certain cases will require that air conditioning and cooling machinery will need to be installed. This aspect of work design is one in which human needs should be given as much importance as technological needs.

On the research and information side a cost project is being organised on new systems of social technology in the industrial sector. In the European Coal and Steel Community programme of ergonomics (No. IV) about a third of the activities will be new technology related.

2/ Biotechnology : There has been a recent increase in the use of biotechnological techniques in various fields. Many of the actions concerned are related to the developments of research activities in these areas. One of the most important biological developments has been the process known as genetic manipulation which results from the discovery of the means of transferring properties from the genetic material of one sort of cell to simple cell structures such as micro-organisms and then by cultivating these organisms on a laboratory or industrial plant cell so that the material is replicated. Codes of practice have been introduced to scrutinise experiments in this field so that the progress can continue without avoidable risk arising from alterations to genetic structures which might have damaging results for man and for the environment. At the present time the results of the assessments carried out indicate that the dangers are small but there is a particular need for safety measures when use is made of micro-organisms which are dangerous to human health. This is an area which has been of concern to the Commission and specific mention is made of the need to ensure that developments are closely followed by its inclusion in the proposal for a Council resolution on a second programme of action of the European Communities on safety and health at work.

3/ Other technologies : The development of other new technologies is one that is continuing apace and examples include the development of laser technology applications, of improved joining techniques, of the use of polymers, composites and other new materials and of catalysis and particle technology. Several of these new technologies depend upon the use of physical agents at the workplace and involve the whole field of non-ionising radiations. The developments of laser technology applications in mechanical manufacturing is an example of a technique which is far from being fully explored or exploited in Europe. It is likely that there will be considerable increase in the annual growth rate of many laser technology applications and in the wide range of sectors which may benefit from this technology. In the same way the use of electronic beam welding is a new procedure which is being exploited because of the significant economic advantages that it brings with it. These techniques, and others such as the use of electromagnetic fields, of radio frequencies, and of micro-waves in industrial applications can bring with them risks to health and safety but the available information on these risks is inadequate at present to determine whether and which measures need to be taken.

Other techniques relating to adhesive bonding, to polymers, composites and other new materials and to materials used in catalysis require careful toxicological evaluation to ensure that the risks to health are reduced to a minimum. While Council Directive 79/831/EEC of 18 September 1979 amending for the sixth time Directive 67/548/EEC on the approximation of the laws, regulations and administrative provisions relating to the classification, packaging and labelling

of dangerous substances makes provision for the testing of new chemical agents placed on the market, there are no provisions at Community level relating to the testing of chemicals whose use in the new technologies may result in considerable exposures, but for which there are few data available.

W. HUNTER

2.4 A SMALL INSTITUTE WITH A WIDE FIELD OF ACTIVITY :

The activities of the European Foundation for the Improvement of Living and Working Conditions in the field of new technologies

From the health effects of working with VDUs (Visual Display Units), to the new working arrangements introduced by office automation and robots, from public administration to manufacturing industry, the EUROPEAN FOUNDATION FOR THE IMPROVEMENT OF LIVING AND WORKING CONDITIONS (FEACOVIT) has, since its very inception, taken a keen interest in the emerging technologies. Indeed, what could be more natural for a body whose task is to develop and pursue ideas on the medium- and long-term improvement of living and working conditions and to identify the factors of change.

Wide field of activity

The Foundation was set up in 1975 (1) with the aim to contribute to the planning and establishment of better living and working conditions through actions designed to increase and disseminate knowledge likely to assist this development, with particular emphasis on :

- man at work
- the organization of work (particularly job design)
- problems peculiar to certain categories of workers
- the long-term aspects of improvement of the environment
- the distribution of human activities in space and time.

Clearly, questions of this magnitude cannot be tackled head on. The approach has to be channelled through the intermediary of specific themes and priorities. Those themes are selected and the priorities set by the Administrative Board which firstly maps out the general outlines of the Foundation's four-year operating programmes, which are then fleshed out in annual programmes. The two key themes given priority in the 1977-1980 and 1981-1984 programmes are shift work and new technologies, both of which will be dealt with in detail later in the present article.

Taking the annual programmes as the starting point, national research institutes are commissioned to carry out specific studies in parallel in various Member States. Their findings are then distilled

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(1) Council Regulation No. 1365/75 of 26 May 1975.

into a consolidated report which attempts to draw out at European level the common features of the situations and developments examined. The results of each study and each consolidated report are published, with a few exceptions, in all the official languages of the Community.

Innovative structure

We have already referred to the role of the Administrative Board, but it is worth pointing out how it is made up. It is a quadripartite body uniting together the Commission of the European Communities, national governments, workers and employers. The Commission has three representatives on the Board, the other groups having one each for each Member State. The Board is also assisted by a group of experts upon which it can call for advice.

This organisational structure is carried through into the implementation of programmes : it is reflected in the coordinating committees whose job it is to define the specifications for studies, and in the evaluation seminars organised to appraise the findings of studies.

New technologies

As we emphasized in our brief introduction to the Foundation, one of the priority research themes is the impact of new technologies on living and working conditions. The subject was included in the first four-year programme (1977-1980), and forms the core topic of the second programme for the four years from January 1981 to December 1984. This programme focusses on a number of key aspects related to the introduction of microchip technologies, namely :

- the effects on the organisation of work
- the effects on shift work
- physical and mental stress

Organisation of work

The relations between technological change and the organisation of work are being examined from three viewpoints :

1. The functional viewpoints : the advent of the interactive office : Phase 1 : 1981, and Phase 2 : 1984 (1)

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(1) The years given for studies are those during which work was commenced and not the date of completion of these studies.

2. The sectoral viewpoint : the impact of new technologies on the organisation of work in banks and the insurance business (1981), supermarkets (1982), public administration (1983), and manufacturing industry (1984)

3. The relational viewpoints : changes in the organisation of work and the roles of the parties involved :

   (a) the role of the parties involved in designing and implementing new ways of organising work (1981-1982)

   (b) the role of the parties involved in the introduction of new technologies (technology agreements); Phase 1 : 1982, and Phase 2 : 1984

   (c) the relations and interactions between the changes in the organisation of work and earnings (1982).

Shift work

Right from the outset, the question of shift work has been a central theme of the Foundation's research activities. The current research into the impact of emerging technologies on shift work is, in many ways, a continuation and the culmination of all previous research done in this field. In 1984, a start will be made on tying-up and updating all the work accomplished in this field.

The underlying aim of the recent research has been to show how the application of technological advances has affected traditional shift-working systems. Two specific lines of inquiry were followed :

1. The necessity of shift work in certain industry sectors and the economic and social consequences of changes

2. The effect of technological innovations on the spread or reduction of shift work, and the prospects for improving the conditions of shift work by introducing new technology.

The industry sectors selected for study in both category 1 (chemical industry / 1981; brewing : 1983) and category 2 (motor vehicle industry : 1981; printing : 1982; iron and stell : 1983) were all those in which significant inroads had already been made by new technology in one form or another (production line control, robotics, photocomposition, etc. ...).

Stress

A preliminary study on physical and mental stress conducted in 1980-1981 was used as the basis for research into the impact of new technologies in the posts and telecommunications sector (1982), and on older workers previously employed on mechanical processes (1983). A man/machine interface study along the same lines will also get under way in 1984. The aim here will be to examine how new technologies are designed and implemented in the workplace, and to assess how far the physical and mental abilities of human operators are taken into account in designing machines and system performance.

1984 will also see the start of research into the introduction of new technologies into the health care services and their impact on the working conditions of those affected.

"Tele-commuting" (1)

During implementation of the 1981-1984 programme a decision was taken to conduct research into the growth of "tele-commuting" in France, Italy and the United Kingdom, supported by an overview of the situation in Sweden and the United States.

Living conditions

The emphasis laid on the implications of new technologies for working conditions does not mean that the Foundation has relegated living conditions to the background. Among the topics it has studied are the effects on products and services and the benefit to the consumer, and the effects on shift work and stress on family life and private life in general. Looking at things the other way round, the other two major foci of the 1981-1984 programme dealing essentially with living conditions (working time / leisure time, and travel between home and work) provide further indicators as to the impact of microchip technology on working conditions.

Working time / Leisure

Following a general overview of the question (1980), three different tacks have been taken in developing this project :

- the effects of retirement on the living conditions of retired workers - 1982

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(1) We use "tele-commuting" to mean computer-integrated working by individuals or groups of employees away from the premises of their employers.

- research into how the unemployed occupy themselves - 1983

- the relation between increased leisure time and the time for which certain services are used - 1984.

Transport

This project began with a general survey on travel between home and work in the Community (1981), followed up by studies on :

- the journey between home and work; the effects on the safety and health of workers (1982)

- the influence of the different parties concerned on the safety and health of workers/travellers (1983).

Research activities in this particular field will be moving away slightly from the general theme in 1984 to focus more closely on the transport of dangerous goods.

Housing

Finally, a new study theme on housing was introduced in the annual programme for 1984. It is a preliminary study, while the specific problem areas which should be the focus of the future research of the Foundation will be determined later on.

It is yet too early at this stage to draw conclusions about projects, certain stages of which have barely got under way, or have not yet got off the ground. Nevertheless, we felt that an introduction to the European Foundation for the Improvement of Living and Working Conditions had an intrinsic value. We also hoped to show, through a brief overview of its work, the importance the Foundation attaches to studying of the impact of new technologies on working and living conditions. The new programme for 1985-1988, which will be defined during 1984, will undoubtedly confirm that view.

Bent PEDERSON, Deputy Director

A. COEFFARD

Further information may be obtained from :

European Foundation for the Improvement of
Living and Working Conditions,

Loughlingstown House,
Shankill, Co. Dublin, Ireland

The Foundation also publishes a catalogue of studies published and those scheduled for publication in 1984.

2.5 ESPRIT : FOR EUROPE's SURVIVAL IN INFORMATION TECHNOLOGIES

The backwardness of European industry compared with the Americans and Japanese on the production and application of information technologies sparked off the sudden realisation of the need for a European strategy and the pre-eminent role research and development in those fields would have in the post-industrial world.

The European Strategic Programme in Research and development in Information Technology, ESPRIT, is clearly an indispensable component of any overall European strategy for a society dependent on information technologies. Research alone, however, will never be sufficient, and ESPRIT in its turn will require complementary industrial and market policies.

The build-up towards ESPRIT

Experience with the various Community programmes on Research & Development (R & D) carried out in the past showed that such actions were capable of catalysing cross-border collaboration between the members of the European IT community. However, with a growing recognition of the seriousness of the problems described, it became evident that a new major effort was needed and ESPRIT was chosen for the initial activity.

During 1980 the scientific preparation of a substantial R & D effort in the field of information technology got underway. The orientation was towards long lead-time R & D (LLT-R&D) of generic and essentially precompetitive (1) nature, needed to strengthen the ability of the European IT industry to innovate and requiring a European scale of attack.

In parallel with these studies undertaken by the Commission of the European Communities (CEC) and external consultants, a dialogue was set up between the CEC and the major European companies in the IT field. As a result, these companies, together with the CEC, entered into an exercise called the Joint European Planning Exercise in Information Technology (JEPE-IT) to define a programme of cooperative long-term research capable of being carried out by industry and research bodies in collaboration.

JEPE-IT used as a basis for discussions the consultants' LLT-R&D reports which emerged during 1981 and 1982. The companies accepted the broad conclusions of these studies and, within the framework of the Commission and working to an accelerated timescale, deployed

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(1) 'precompetitive' refers to the early stages of the R & D cycle, and excludes product development.

considerable resources in terms of key engineers to form a number of Technical Panels to study in depth the various key subsectors of IT. During 1982, these Panels produced substantial reports of their deliberations.

Altogether, a large amount of documentation was produced which analysed the R & D scene in IT and identified the topics of major European initiative. The results are summarised in document COM(82)287 final (May 25th,1982) "Towards a European Strategic Programme for Research and Development in Information Technologies" and in COM(82)486 final/2 (August 13, 1982) "On Laying the Foundations for a European Strategic Programme of Research and Development in Information Technology : the Pilot Phase".

Later in 1982, the work of the major companies was supplemented by a number of workshops and Review Boards, constituted largely from SME representatives and academics. The consultants' LLT-R&D studies and the JEPE-IT Technical Panel reports were used as inputs and a substantial report was produced in December 1982 which refined and extended the conclusions reached in the earlier work.

An important first step of all the preparatory work referred to above, was to map out the IT situation today and to attempt to predict the way the technology is likely to evolve in the future. This was obviously necessary before a Community R & D programme could be defined.

To maintain the momentum generated through the JEPE-IT and the workshops, the CEC initiated contracts for a number of Preparatory Studies. These will be completed during 1983 and, as well as being technical studies per se, will make recommendations on further R & D that should be pursued as part of ESPRIT.

In December 1982, the Council of Ministers approved the initiation of some 16 ESPRIT Pilot Projects, drawn from the recommendations of JEPE-IT Technical Panels (see COM(82)737)). These Pilot Projects last one year initially (1983/84) but it is intended that continuations of these projects will form part of the main ESPRIT programme starting in 1984.

In early 1983, the programmes of work recommended by the earlier studies were collated and unified into an ESPRIT Workplan. This Workplan is open to detailed revision in the light of further work, including the results of the Preparatory Studies, but its overall structure and content is unlikely to be substantially changed.

ESPRIT overall objectives and benefits

The overall objective of ESPRIT, is to assist European industry to develop the indigenous technological capability needed to design manufacture and use profitable and highly competitive information products, systems and services able within ten years to compete successfully and profitably with the US and Japan. Associated objectives are :

- To establish an R & D framework and infrastructure that will provide the European IT industry with opportunities to collaborate internally, with the academic sector and with other research organisations. Mobilising European resources will take advantage of many different technical strengths and raise technological capabilities to a higher competitive level in less time than could be possible by more limited individual or national resources.

- To assist the emergence of a continental scale homogeneous market for IT systems and products by collaborative projects.

The ESPRIT programme

ESPRIT is a Community programme which has as its overall aims the execution and dissemination of the results of precompetitive research and development on methods, techniques and processes for components, hardware, software, systems and embedded subsystems of advanced information technology. The programme also has the wider aims of technology development, technology transfer and impact analysis.

The ESPRIT programme is part of an industrial strategy directed towards strengthening the manufacture and use of IT products in the Community. It will thus promote the creation of a technology base for European industry from which it can develop products, processes and services permitting successful competition on world markets and the acquisition of important market shares.

To achieve these objectives, cooperation between industry (large companies and SMEs), software houses, research institutes and universities must be encouraged. ESPRIT must also be concerted with the activities in Member States so as to achieve maximum benefit for the whole Community.

Accordingly, the ESPRIT programme is oriented towards :

- precompetitive cooperative R & D on a Community scale

- generic industrial R & D of strategic importance.

"Precompetitive" refers to the early stages of the R & D cycle, and excludes product development. Thus it concentrates on directed research and experimental development where cooperation between competitors in the market place is a realistic proposition. The term also comprises any elements of basic research that are included in the programme. The "Community scale" is a necessary condition for the CEC initiative, and implies cross-border collaboration on those R & D topics that can benefit from European collaboration. The term "generic" implies the exclusion of R & D topics that are of limited potential, unless such topics are vital to the achievement of wider R & D objectives. Finally, the term "strategic" implies a wide range of applications, particularly those applications in sectors which are of major economic importance to the Community.

The term "strategic" is important in another sense : it describes the purposeful nature of ESPRIT, the R & D being pursued with a series of industrially-oriented objectives in mind. This strategic characteristic, coupled with the intention that industrial and other R & D organisations will participate as full partners with the CEC, distinguishes ESPRIT from other IT programmes.

Factors influencing the ESPRIT programme planning

In addition to the broad objectives summarised above, three factors were taken into account in planning the ESPRIT programme :

- The limited number (relative to the scale of resources required) of European scientists and egineers capable of carrying out the R & D work who can be made available for the ESPRIT programme

- The rapid rate of evolution in IT technology and consequently of the market and the competition

- The inherent difficulty of planning research activities in detail, when future R & D depends on the progress (or lack of progress) of previous work and when unforseen new concepts and technologies can arise at any time.

These factors, combined with the broad objectives, have led to a programme which :

- Tackles selected long-term R & D topics of major scale and significance

- Is directed towards making it as relevant to industrial needs as possible

- Builds up in time in a realistically achievable manner

- Contains a significant degree of tactical flexibility in order to adapt to changing circumstances.

The anticipated benefits of ESPRIT

Collaboration should lead to :

- Yield much greater benefits in knowledge gained and time saved than could be possible by smaller scale individual efforts

- Favour the emergence of a "Silicon Valley" synergy or syndrome leading to more rapid innovation and higher profits

- Reduce vulnerability to embargo of licensed technology

- Provide opportunities to agree on proposals for interface and interworking standards and protocols needed for a continental scale market

- Encourage a synergetic end user environment to benefit all sectors of the economy and social services

- Create a body of common technology that will assist the creation of a more homogeneous European Market (e.g. common CAD/CAM/CAT systems will influence manufacturers and end users of a very wide range of new systems and services).

In short ESPRIT is a precondition sine qua non for the successful promotion of European information technology industries.

Size of ESPRIT programme

It is also an example of valuable European cooperation as indicated in precompetitive research as expressed in the Communication to the Council (COM(82)287 final of May 25, 1982). The IT Task Force gives the Commission the institutional means for coordinating and integrating the programmes of the various Directorates General, notably

DG III (Internal Market and Industrial Affairs), DG XII (Science, Research and Development) and DG XIII (Information Market and Innovation) - related to "directed technological research" on information technology.

The ESPRIT programme has been approved by the Council on 28 February 1984; the financial contribution of the Community over the five-year period of the programme will be 750 million ECU.

M. ENGLISH

3.

PART TWO
ACTIVITIES IN MEMBER STATES

New Technologies and Social Change in Europe

Introduction

In 1981 the Commission set up the "European Pool of Studies and Analyses" (EPOS) with the aim of collecting, evaluating and circulating the results of research activities in the field of social effects of new technologies in the Member States. The Pool is based on a network of national correspondents providing on a regular basis information and analyses on the developments in each country.

Their contributions have until January 1983 been published under the title "Social Change and Technology in Europe"; eleven issues have been disseminated in the period 1981 - 1983.
Information and analyses on developments in Member States are now published in this Supplement "New Technologies and Social Change".

This issue presents a general report on member countries (not including Luxembourg and Greece), covering developments in the period mid 1982 - mid 1983.

The present report is a revised and shortened version, edited by the Commission staff, of contributions prepared by the following experts (1) :

National Correspondents

Mr. Brady	- Science Policy Research Unit, University of Sussex, Brighton (United Kingdom)
Prof. Pöhler	- Landesinstitut der Sozialforschungstelle, Universität Dortmund (Federal Republic of Germany)
Mr. Pastré	- Centre de Recherche en Economie Industrielle, Université Paris Nord, Villetaneuse (France)
Prof. Piacentini	- Istituto di Economia, Facolta di Statistica, Rome (Italy)
Dr. Hingel	- Institute of Industrial Sociology and Organization, Copenhagen Schools of Economics and Social Science, Copenhagen (Denmark)
Dr. van der Werf	- Ministry of Social Affairs and Employment, The Hague (The Netherlands)
Dr. Lohle-Tart Mr. Boulanger	- Association pour le développement de la Recherche appliquée en sciences sociales (ADRASS), Ottignies (Belgium)
Prof. O'Kelly	- Department of Industrial Engineering, University College, Galway (Ireland).

(1) The utilisation of this information does not engage the responsibility of the Commission.

3.1 SUMMARY OF NATIONAL REPORTS

In all countries within the EEC we can notice an accumulation of experiences from the development and application of information technologies :

* an experimental automatic "flexible" manufacturing system is being set up in Italy (I)

* an automatic clearing centre is being introduced by the banks in Belgium (B)

* 98 % of secondary schools in the United Kingdom (UK) are equipped with microcomputers

* a centre for automatic registration and treatment of bonds and stocks has been established in Denmark (DK)

* all households will be able by 1986 to receive cable television programmes in Germany (D)

* and in France (F), a tele-text system connecting 80-100 000 units will be set up, etc.

These are only spectacular indicators of a much deeper and general process of "informatization" of society which entails major social change.

The aim of the national reports is to collect, analyse and spread information on technical, economic and social experiences related to the development and application of new information technologies. Four major fields are studied :

* Government policies (promotion of R & D, labour law, working conditions, health and safety, educational policies, vocational training, civil liberties and awareness activities)

* Social groups (trade unions and employer organisations, collective agreements, political parties, labour disputes and other conflicts)

* Research (social implications, alternative applications)

* Experiences in specific sectors (banking, insurance, finance, retailing, telecommunications and manufacturing).

The national reports published below present current events in all the above mentioned fields for the period June 82 - June 83.

National schemes for the promotion of Research and Development (R & D) in the field of information technology have been set up in all the EEC Member States. One notices in general that these programmes are being implemented but also that they are becoming increasingly selective (promotion of specific technical areas within robotics, office automation, telecommunications, etc.). Further, one can observe a trend towards giving greater importance to the promotion of R & D in fields other than Information Technology (IT) hardware. Though promotional schemes in IT-hardware products are still being actively presented and set up, recommendations for increasing the relative importance of R & D in software fields are put forward in most countries. One registers also recommendations aiming at promoting R & D in the field of more efficient marketing methods (the Irish Telesis Report) and dealing with possible improvements in the field of applications. Major efforts are made as to the latter aspect. Let us just refer here to structures such as : the Microelectronic Centers (NL), the Information Technology Centers and the Information Technology Circles (UK), as well as the plans for an extensive structure of "Resource Centers" under the so called "Reseaux X2000" plan (F). These promotion and awareness schemes in the "field of application" described in the national report below, have by now been achieved to various degrees, but very limited information is available as regards schemes carried out and their impact.

Major attention is paid to the general development of competence and knowledge in the field of information technology. One notices especially discussions on the content and level regarding the teaching of computer science in primary and secondary schools. Fourteen years is thus put forward as the lower age limit for understanding informatics from the point of view of abstract thinking and mathematics (the Uhlenbeck Commission (NL)), while another report reckons that even younger pupils would be able to understand the subject from a perspective of "machinology" (the Plomp Commission (NL)). In a British report the viewpoint is stressed that pupils of all abilities should be encouraged to follow technology courses, which are available to them, up to the age of 16. In certain countries, major efforts have been made to define the subject of informatics as a "tool" for solving problems and executing predetermined tasks; the limits and possibilities of such a tool have also been pointed out (DK). One records in most countries a general lack of qualified teachers, and especially a lack of women teachers in the field. This latter point has been emphasized in a British Report (from Her Majesty's Inspectorate) which further points out a similar "sexist bias" among pupils taking technology courses. An innovative way of solving such difficulties is reported by the London borough of Croydon, where boys are refused places on courses in informatics if they do not turn up with a similar number of girls. Meanwhile, the introduction of microcomputers is continuing, especially in secondary schools : 98 % of secondary schools are equipped with microcomputers in the United Kingdom; 90 % in Denmark; more than 60 % in Ireland and more than 6 000 microcomputers are available in French secondary schools.

The general lack of computer experts in industry that all countries indicate - the only exception here is Ireland where an overproduction of engineers is apparent - has put pressure on higher education institutions. In order to raise on a short term basis the number of experts available for the industry, new teaching posts are created and additional funds allocated. In the national reports innovative solutions are mentioned such as "calling on teachers from neighbouring disciplines", "calling on professionals from industry", or "offering new types of expert education in informatics on a cross-disciplinary basis (coupled with social sciences, humanities and/or business economy)".

As to governmental actions in the field of working conditions and health and safety, extensive statutory regulations were set up in most countries in the 70s' and numerous directives and recommendations put forward as regards the application of information technology. More recently, new laws have been passed in France and the Netherlands. However, because of the "high pace of change" in fields such as robotics, a certain reluctance to adopt statutory regulations can also be seen, as in the UK for instance.

Another area of concern relates to civil liberties. The regulation of present data information systems - the regulation of the gathering and use of data - has been secured in each country in various degrees by means of laws and/or collective agreements. In Italy, for example, a draft Bill - based on the principle of freedom of data collection - seeks to provide the individual with the right to access to filed information concerning himself as well as the right to refuse the gathering of data related to his race, religion, political opinions, union membership etc. In several national reports (DK, D), stress is put on the fact that the protection of civil liberties becomes even more difficult to achieve with the increasing introduction of microelectronics. However, one registers a widespread belief that these problems could be solved by technical means (DK, D).

As to research dealing with the social consequences following the application of new technology, it is noticeable that employment issues are becoming increasingly predominant. Research results in the field appear however often contradictory and always very difficult to group and compare:

* a Dutch report estimates that the introduction of micro-electronics will induce a loss of 95 000 jobs by 1990,

* a British report conjectures that no job creation will occur within the service sector following the introduction of information technology, and that more jobs have been lost than created in the electronic industry,

* a Belgian study evaluates that, unless measures for reducing working hours are accelerated, a loss of 34 000 to 134 000 jobs will take place,

* but in a French evaluation of the employment effects of the "mission filière électronique", one expects the creation of about 200 000 jobs.

It appears even more difficult to assess qualitative research results, as such studies are often carried out on a local and monographic basis. Besides, the interpretation of research results requires that "figures" and "experiences" are not taken out of their specific national and social contexts.

In the section dealing with social groups, numerous analyses and descriptions of trade union policies are provided. The technological issue which was treated in the late seventies as a distinct subject, is increasingly discussed as an integral part of a comprehensive employment and training policy. This is especially the case when policies are drawn up on a federation or confederation level. As to employer confederations much concern is shown regarding the social end economic conditions for the rapid introduction of new technologies within firms. In order to regulate the introduction and application of new technology numerous technology agreements are being signed in several countries. A pioneering agreement has for instance been reached between the German trade union federation IG Metall, and the engineering firm Vögele, which stipulates that individuals are ranked in wage scales according to their personal qualifications and not according to the job they carry out. This principle which has formed the basis of a major union claim, dissociates the introduction of new technology from down-scaling.

As far as sectors are concerned, it is especially in telecommunications, in banking and in the finance sector that experiences as to the application of information technology can be found. In the national reports, descriptions of the following experiences within the telecommunication sector are provided :

* an interactive cable network system is planned on an experimental basis in the southern part of the Netherlands (South Limburg) involving 700 000 inhabitants,

* 13 bill. DM were planned to be spent in 1982 by the German Post Office on cabling projects,

* a fiber optic wide band system covering all towns with more than 250 inhabitants is planned in Denmark,

* a teletext experiment of decentralized part-time "home-workers" has started up in Baden Würtemberg,

* an information network for the monitoring of the labour market at regional and sub-regional level is planned under the programme LAVORO in Italy,

* in order to assess the usefulness of "telesoftware" for schools, a teletext experiment has been carried out in the United Kingdom involving nine schools, scattered throughout the country, Brighton Polytechnic, BBC and ITV,

* a fiber optic wide band sytem will be build up in France involving 1.4 millions households.

A.J. HINGEL

3.2 UNITED KINGDOM

3.2.1 Government activities

Continuing government commitment towards new technology has been evident in the support given to industry through the various schemes run by the Department of Industry and its overall strategy in key areas of technological development. For example, several reports, initiated by the government, have been published on various aspects of information technology - in particular the report of the Alvey Committee on the next generation of computers (see under R & D) and the Hunt report on cable TV (see under Telecommunications).

Education and training continue to be important areas of government policy. There has been an extension of the micros in schools scheme, so that primary schools as well as secondary schools are eligible for government aid when purchasing computers (see under Education), and the number of information technology centers has been raised.

1982 ended with a special conference on Information Technology (IT) to take stock of IT 82 and to provide a forum for the announcement of some new government initiatives in IT.

Prime Minister Margaret Thatcher underlined her personal commitment to cable television saying that the Government were "determined to encourage cable systems, not just for more entertainment but eventually for a huge range of two-way services". The Government published a White Paper on the subject in May 1983.

The Government continued its support for IT in industry by announcing a series of measures. There was more money for several of the Department of Industry schemes and the Department of Education and Science also announced a package of support for information technology over the next three years.

The British Technology Group (BTG) will undergo a change in its nature as part of the Government's plans to encourage the privatisation of certain IT projects. BTG's budget has been cut from UKL 25 million in 1982 to UKL 10 million for 1983. The Government plans to accelerate the sale of the National Enterprise Board (NEB) holdings of BTG to provide funds which can be used to support other IT projects such as the Alvey Committee's fifth generation project. The National Research and Development Corporation (the R & D arm of the British Technology Group) will then take over the role of 'seeding' new projects.

3.2.2 Promotion of Research and Development

In April 1982 the Department of Industry (DoI) announced the establishment of a study group on producing the "fifth generation" of computers for the 1990s. The group was led by John Alvey, British Telecom's senior director of technology. The group's findings were presented in September 1982, the central recommendation being that around 60 % of the total cost of the development and production of fifth generation computers (estimated to be about UKL 350 million overall) should be met by the state, the balance coming from industry.

In April 1983 the Government agreed with the Alvey recommendation to stimulate collaborative research (Industry, Universities, Government) on software engineering, man-machine interface, intelligent knowledge-based systems and very large scale integration (VLSI). Instead of the UKL 250 m. funding Alvey wanted, the programme would get UKL 200 m. over the next 5 years, with a restriction to 50 % funding of industrial collaborative work.

The end of April 1982 was the publication of a report "Policy for the UK Electronics Industry", prepared by the Electronics Economic Development Committee (EEDC), and launching an ambitious and challenging strategy for the industry calling on government, industry and the Trades Unions to work together in specific growth areas (for which the BTG should give a priority) such as information technology systems, mass market IT products, mobile radio, commercial exploitation of military electronics, and more component and software technology in all these fields.

The BTG continued to provide support for a broad range of high-tech ventures. However, as already indicated, the Government will reduce BTG's role in the future; in December 1982 it was decided to sell off the computer-aided design (CAD) firm Compeda to an American company, and in April 1983 the CAD-Centre was sold to a UK-based consortium.

Various Government support measures have been revamped or amalgamated; in May 1982 the Software Products Scheme was given a UKL 10 m. boost to develop packged software products over the next 3 years, in June the DoI launched a UKL 60 m. scheme to encourage the automation of engineering production lines, while in November the extension of the microelectronics awareness programme was announced. The various high-tech support schemes were grouped together in September 1982 under one banner : Support for Innovation.

In February 1983 it was announced that the DoI was funding a study into software engineering and its use in the UK. The consultants Pactel, who are doing the study, think that the UK software engineering market will be worth about UKL 50-60 million by 1985 with more growth in the years to come.

In March the House of Lords' Select Committee on Science and Technology recommended that Government expenditure on industrial R & D should be increased by between two and three times the amount now spent on it.

In fact in the Budget in March the Chancellor announced more funding for various DoI schemes in the IT area. UKL 40 million was made available for the innovation-linked investment scheme with a further UKL 10 million for a CAD/CAM awareness programme (in addition to the UKL 6 m. from 1982), and UKL 25 m. for the development of new software products (on top of 1982's UKL 10 m.). There is also UKL 5 million for a new telecoms product scheme.

3.2.3 Safety and Health

The Government's Health and Safety Executive (HSE) has set up a liaison committee with industry and is training its factory inspectors to deal with the problem of health and safety with respect to the use of robots. At present there is no specific legislation to cover this area and the HSE feel that it is unlikely that there will be in the near future given the pace of change in robotics and the rapid obsolescence of any new legislation.

An inspector at the Health and Safety Executive has published a report on the hazards of radiation from VDUs (visual display units) which states that "there are no radiation levels that could be considered to be of concern to the normal individual".
On the contrary, research at the Technical University in West-Berlin has identified come VDUs as the cause of eyestrain, backache and exhaustion.

The Minister for IT, Kenneth Baker, and Lord Trefgarne, the Parliamentary Secretary for health and social security, announced a UKL 2.5 m. scheme to help general practitioners and family practitioners committees to buy and develop computer systems to help with the registration of patients and the screening of cervical cancers. The Government would also provide half the cost of installing micro-computers in 150 general pratices.

Micro-computers are being installed as part of occupational therapy in four hospitals and three day centers. Eleven micros have been

successfuly installed so far by the Department of Health and Social Security (DHSS) and the Minister for Social Security and the Disabled is considering whether to extend the scheme.

3.2.4 Activities in the Education Field

In July 1982 the Department of Industry announced the extension of the Micros in Schools scheme to include primary schools as well as secondary schools. The scheme started in October 1982 and there are three packages on offer to the primary schools as opposed to the two that were available to secondary schools because the Sinclair computer is now accepted as suitable for use in schools. The three packages available to the primary schools all include a micro-computer, a cassette recorder, choice of monochrome or colour monitor, and training material put together by the Microelectronics Education Programme (MEP).

The packages (half the cost of which will be met by the DoI) reflect the feeling in the DoI and the MEP that primary schools need more sophisticated machines than secondary schools to start with. Graphics is considered almost essential so the three packages available are based on more advanced computers than offered previously.

The MEP is preparing a paper comparing the three machines (BBC/Acorn model B, RM Link 4802, Sinclair ZX spectrum) in terms of technical data and with the needs of education in mind. MEP is also producing a multi-media training package which will come free with the hardware. However, all three companies involved in the scheme have been experiencing difficulties in meeting production schedules. Delays in getting the BBC/Acorn models were considerable, particularly for the Model B with a waiting list at one time of 9 month. Shorter but equally important delays were experienced with the other producers, and they caused complaints to the Advertising Standards Authority about advertised delivery times.

A different sort of educational aid has finally reached the market after four years of development. Called the Microwriter and looking like an old-fashioned pocket calculator, except that it only has five keys, the machine is a portable word processor. It is possible to connect the Microwriter to a normal television VDU and it also incorporates a speech synthesiser. It could present opportunities for use with handicapped children, and the unit requires only a very light touch on the keys which means that physically handicapped children are able to use them. A number of schools are already using the Microwriter.

The Government's policy on education and IT reiterated support for the use of computers in schools and in a move at the end of 1982

the Secretary of State for Education, Sir Keith Joseph, announced, in a written reply, that the DES was to find UKL 100 million to support information technology over the next three years on students, research and further education.

A report by Her Majesty's Inspectorate, "Technology in Schools", recommended that pupils of all abilities should be encouraged to take technology courses, that technology should have a place on the school curriculum up to the age of 16, and that more women teachers should be involved in the courses. The report was based on a survey of 90 schools in England and Wales and found that the courses were popular with those taking them but that only a small minority of pupils (mainly boys) took such courses. The "almost total absence" of girls from technology courses was attributed to a sexist bias in course descriptions and curricular material and the fact that most Craft/Design Technology (CDT) classes were staffed almost entirely by men. One London borough (Croydon) took steps to try to ensure that more girls would take courses in computer studies, by refusing places on computer enthusiasts' courses to boys from mixed schools unless they bring an equal number of girls with them.

The educational use of Telesoftware (transmitting computer software by teletext or telephone lines) has been the subject of a project run by Brighton Polytechnic together with BBC and ITV, computer software being transmitted to 9 schools scattered around Britain using teletext with the aim of assessing the usefulness of telesoftware for schools. The BBC announced in January 1983 that it was going to broadcast telesoftware beginning in March following five years of experiments. The programmes will be broadcasted free but customers will have to buy a special TV-set adaptor which links only to the Acorn BBC computers.

A number of summer camps were organised in 1982 with the accent on high technology mixed with sport and other activities. Dolphin camps (assisted by the DoI, Apple, Acorn computers, BP, Lloyds Bank) ran two summer camps for 1000 children while Interaction ran others with the loan of Tandy computers.

An extra 5000 places for higher education students of IT will probably be made available over the next three years with 400 extra staff in universities and polytechnics, and it was announced that UKL 5 million was to be spent on equipping about 500 further education colleges with up to date CNC (computer numerically controlled) machine tools. The two year CNC in Further Education scheme will be run by the DoI in much the same way as some other DoI schemes in that there will be 50 % grants available for the purchase of the equipment, the balance coming from the colleges involved.

In March 1983 the Government announced plans to nearly double its expenditure on computer education in schools. the MEP will now run for a further three years (until March 1986) and will get at least an extra UKL 9 million for the provision of software in schools. So far every UKL 1 of Government money has been raised by UKL 3,50 by schools, parents and industry.

Then in May came the announcement that the Micros in Schools scheme was to be extended with the allocation of another UKL 3 million. The first scheme finished in 1982 with some 98 % of secondary schools in the UK having at least one computer. This new scheme is to enable these schools to upgrade their equipment with the DoI providing grants of 50 % of the cost of the equipment.

These announcements followed one made by Kenneth Baker in December at the IT Conference to mark the end of IT 82. The Government was setting up a UKL 1 million scheme to give experience of IT to teachers of all disciplines, not only math or science.

Figures have been released on the number of different computers sold to secondary schools under the first Micros in Schools project. A total of 6,400 computers was sold under the scheme and as many again were sold to schools in the UK without being included in the Government schemes.

Up to March 1983, about 9,000 computers had been ordered under the second DoI scheme for putting Micros in Primary Schools.

In March 1983, the Government announced the approval of 14 pilot schemes for its programme to improve technical training in schools (the New Technical and Vocational Educational Initiative). The schemes, which will involve about 3,500 children aged between 14 and 18, will be administered by local education authorities under guidance from the Manpower Services Commission (MSC). The scheme will run for five years from September 1983 and will cost UKL 25 million a year.

3.2.5 Training and Retraining

The Government approved UKL 1 million for the establishment of the Open Tech venture in August 1982. The scheme is to be run by the Manpower Services Commission which hopes that 50 000 workers a year will gain wider technical skills under the programme. The main target is technicians already trained in one discipline, but who need new skills to cope with emerging technologies. The available money would rise to some UKL 10 million a year by 1984 and the scheme would use the interactive techniques used in the

Open University including television and radio programmes, and possibly Prestel. By March 1983 a number of schemes were agreed or operational.

In October 1982 Kenneth Baker announced that 50 new information technology centers (ITECs) were to be set up in addition to the 100 that had already been announced at the end of 1981. Most of the people taking part in the scheme had no GCE O-level or CSEs but the centers had achieved a high placement rate with firms. The ITECs should each train about 30-40 people per year, with six full-time teachers at each center. The centers will be community based, open to all age groups in the evenings and sponsored by local industry. Each center will have at least 15 micro-computers.

3.2.6 Increasing Public Awareness of new technologies

1982 was Information Technology Year with numerous exhibitions and conferences being organised under the IT 82 banner. A MORI poll conducted at the end of the year said that six out of ten people had heard of information technology whereas a similar poll at the beginning of the year said only two out of every ten had heard of IT.

The DoI is also funding a study surveying new technology for MPs, which may involve a wide area network linking the House of Commons to the constituencies. The study is to be conducted by consultants EIU Informatics and some 10 % of MPs or their assistants will be asked about their needs.

3.2.7 Trades Unions and New Technologies

Concern about unemployment continues to permeate aspects of trades unions' policy, both centrally at the TUC and within individual unions. Fear about the possible job reduction effects of new technology has been reflected in motions debated at union conferences.

In May 1982 workers of Smiths Food Group's crisps and snacks factories voted for national industrial action over investment in automated machinery which they believe will eventually lead to a decline in the workforce from 4 000 to 1 000, by closing five of the existing eight crisp and snack factories.

In April 1982 Arthur Scargill, President of the National Union of Miners (NUM) said that the introduction of new technology in the mines was causing concern among mine workers over loss of employment. The NUM laid down certain conditions for accepting new technology (4-day week, retirement at 55 an so on).

July 1982 saw the publication of a report from the White collar union APEX which claimed that new technology was being introduced in the South-East of England in an "uncontrolled fashion", and recommended proper agreements for all new technology, effective monitoring and proper training.

At their Annual Conference in May 1983 the Association of Scientific Technical and Managerial Staff (ASTMS) voted overwhelmingly in favour of a motion calling for a campaign for a four-day working week because of the increasing use of technology in offices. They hope to get a 30 hour, four-day week, retirement at 60 and a reduction in overtime working.

In the field of training the electricians union, the Electrical Electronic Telecommunication and Plumbing Union (EETPU), has agreed to lower the rate of pay for apprentices from the existing UKL 41 per week to UKL 27,88. This would be paid by the MSC under the Youth Training Scheme.

Finally, the National Union of Teachers (NUT) is getting involved with computer technology by making available 600 places at its training headquarters in Lincolnshire on twelve courses on the use of computers and the consequences of new technology for schools, while NATFHE (the National Association of Teachers in Further and Higher Education) "urged the Government to provide funding for the development of microelectronics education in further education as a matter of urgency". The report is critical of the fact that the Government support for microelectronics has so far gone almost exclusively to schools rather than colleges.

3.2.8 The position of employers

July 1982 saw the publication of a report from the Confederation of British Industries (CBI) which urged the speeding up of the introduction of new technology into British industry, particularly microelectronics, biotechnology and IT. The report recognised the concern of industrial employees with respect to the effects of technological change on employment, but suggested that Britain's decline as a trading nation and the resultant decline in employment was not due to technological change but was the fault of "poor collective management of it at all levels of society".

The report listed various obstacles to innovation in Britain, including resistance to change in key areas; poor understanding of science, technology and industry, the lack of an industrial forum to develop industrial policies and objectives; difficulties in raising risk capital for technology-based investment; shortage of qualified engineers, technologists and technicians for design, development and production. Improvements were taking place, though, in the form of science parks and technology clubs.

3.2.9 Developments regarding agreements on technological change

In July 1982 the nine Civil Service Unions voted unanimously to withdraw from their agreement with the Government on the introduction of new technology in the Civil Service. However, union leaders believe that there is little they can do to stop the Government continuing to introduce new technology by negotiating locally with individual groups of civil servants. Within the Department of Industry, the Civil and Public Servants Association (CPSA) has been trying to win a no-redundancy agreement or the assurance of redeployment for those affected by the introduction of new technology. The CPSA is also involved in negotiating a new technology agreement with British Telecom providing for full union co-operation with the introduction of new technology in exchange for a two-year no-redundancy clause.

Another public sector union, the Inland Revenue Staff Federation (IRSF), rejected a draft new technology agreement from the Government. The computerisation of the tax system is a particularly important part of the Government's new technology programme, but the IRSF insists on no compulsory redundancies, redeployment and sharing benefits (8500 jobs could be at stake). In the audio-visual field the BBC and the unions reached an agreement on the use of new technology and payments for night work after a lengthy period of negotiation prior to the start of the BBC's breakfast TV in January 1983.

The Banking Insurance and Finance Union (BIFU) passed a motion at its annual conference in April 1983 to hold out against the introduction of new technology where there were no agreements between the union and management.

An agreement of a different kind was reached by the Lucas Group and the two white collar unions, APEX and ACTSS (the white collar section of the TGWU). The agreement covers the protection of personal information and includes a promise that the information will not be released to outside bodies.

A report in October 1982 from the Labour Research Department, stated that there had been a growing number of agreements between unions and employers on the introduction of new technology, although most of these covered white collar workers in offices. One third of the work places studied had introduced new technology, based on micro-electronics, without consultation. One third involved some form of negotiation and in another third of the cases the introduction of new technology was preceeded by formal agreements, 30 % of which stipulated that there should be no job losses or redundancies. The majority of trade unionists questioned said that their jobs had not been deskilled by the introduction of new technology and half thought that their jobs had been improved.

3.2.10 Labour disputes and other conflicts

In the public sector there have been a number of technology disputes over the past year. In the NHS the new computerisation policy caused industrial action in computer centers which may cause a shift towards the use of stand-alone minicomputers of existing mainframes to prevent centralised distribution. Government plans to computerise the social security system were blocked by Civil service unions in the absence of assurances on job security (25 000 jobs could disappear by the mid 1990's). The CPSA unsuccessfully opposed the transfer onto mainframe computer of data from DoI development offices, and the IRSF threatened action over the rationalisation of tax collection with computer centers (4 000 jobs at risk). The privatisation plans of British Telecom caused the POEU to block connections between the BT network and the private Mercury communications systems, as well as opposing privatisation itself.

In the IT sector ICL engineers threatened a strike over flexible rostering, while disputes at Timex in early 1983 over redundancies affected production of Sinclair computers and flat-screen televisions. Another dispute lasting 9 month arose connected with union organisation in a small new technology firm, Electronic Data Processing, where the dismissal of a worker who had been involved in trade union recruitment was adjudged unfair by an Industrial Tribunal.

3.2.11 Other Social Groups

At the Town & Country Planning Association Conference in November 1982 the need for a change in planning laws became apparent if technology-based industries and science parks were to develop. Of special concern were considered regional grants which were related to jobs created and did not take sufficient account of the electronic industry's needs.

The National Computing Center announced that is was going to set up Information Technology Circles on a national basis to provide management with much more specific information on which to base decisions about investment and computer utilisation.

The Council for Science and Society, an independent charity advised by senior scientists and academics, published a report on the need for more controls on new technology, particularly more effective scrutiny and democratic control over technological developments.

The 1982 annual report from the Royal National Institute for the Blind claimed that many of the simple repetitive manual jobs blind

people used to do were being automated with the result that more blind people were now jobless and blind people also tend to stay unemployed twice as long as sighted persons.

The National Economic Development Office (NEDO) published a response to the Alvey Report in February 1983 which suggested that if Britain went ahead with a research programme in isolation it would not produce commercial success and recommended 'dovetailing' the Alvey proposals with the EEC's ESPRIT project so that European multinationals could be involved in the research in certain areas.

Another NEDO report found no evidence to support the assertion that Information Technology creates jobs in the services sector, whilst detailed statistics were presented which show that more jobs have been lost than have been created in the IT industry itself over the last ten years.

3.2.12 Social Uses of Information Technology

In the medical field a computerised system to identifying dislocated hips in new born babies has been tested with positive results in Belfast while in London an optical fibre cable network is being planned to link certain medical schools and clinical teaching hospitals in order to save staff and students time.

Computer controlled electricity is becoming a reality for some consumers in the Midlands and Southeast through the development of the Credit and Load Management Systems (CALMS), which should enable consumers to programme electricity needs in line with periods when it is cheapest through constant monitoring of electricity prices, which vary during the day according to generation costs. Estimates indicate a potential saving of UKL 1 bn. per year in England and Wales. Independently the Scotland Electricity Board revealed details of a scheme to prepare bills with the aid of a minicomputer and a portable billing machine which will alow bills to be prepared on the doorstep.

Police forces could soon be testing a system to rapidly identify stolen vehicles by scanning streams of cars by television cameras linked to a computer containing details of stolen or suspect cars. Remaining in the car field, a computerised system providing up to date information on used car prices to dealers became operational this year, using viewdata television terminals.

3.2.13 Women and new technology

The effects of automation in general on women's employment was examined in a report by the Equal Opportunities Commission in January 1983 which noted that women were concentrated in certain areas of work all of which were either directly or indirectly affected by new technology. Nearly 30 firms were interviewed and the only jobs created by the introduction of new technology were in scientific and technical areas where fewer women were qualified.

The EOC is also funding a project at the Science Policy Research Unit at Sussex University, to set up a data base of research on women and technology. The data base is to be called WATCH (Women and Technical Change) and will contain information on all current and completed research in the UK, with possible future coverage of other European countries.

3.2.14 Technological developments in certain sectors

Offices

A recent survey by the Policy Studies Institute (PSI) based on 231 companies with a known computer base has found that job losses occured in one in every four offices which installed electronic office products. The larger offices were more likely to be using word processing systems, mainly for labour saving, although this created little or no resistance to the new technology from unions (8 % of the firms) and office workers, perhaps because the job losses were small. Two-third of the offices had word processors but there was little evidence of electronic mail via local area networks, although the larger firms were moving towards integrated systems. Most firms planned to increase their expenditure on office technology in 1984.

Rank Xerox is to start a scheme involving about 150 key management employees as part of an experiment designed to cut indirect costs at the company headquarters in London. The 150 employyes will be encouraged to set up their own business from home in return for a part-time consultancy contract enabling them to work for other clients as well.

Wang Laboratories announced that they were going to build a UKL 38 million factory in Sterling, Scotland, to produce VDU work stations and office automation equipment and employing up to 700 people within five years.

Banking, insurance and finance

There have been a series of experiments involving automatic cash dispensers in shops, petrol stations and factories; Amoco is to offer Barclaycard cash withdrawl facilities at petrol stations, for example. Other forms of automation are going ahead, though the Midland and Nat-West Banks are to pool cash dispensers, providing the largest network in Europe. The disappearance of cheques and credit cards is under consideration by the major banks which are studying the feasibility of a national payments system linking point of sales terminals to bank computers. However, a report by the Policy Studies Institute suggested there was little propect of early adoption of electronic funds transfer from POS largely due to resistance by retailers, pubs, restaurants, etc.

Remote banking is moving closer, however, with the Midland experimenting with computer-based cash management systems for companies, the use of television sets by customers in branches to check accounts with a possible extension via viewdata to customers using televisions at home, but not for monetary transactions. These are seen as first moves towards home banking. The Nottingham Building Society in collaboration with the Bank of Scotland is also moving towards home banking, with the provision of free consoles for certain customers linking via TV into a Prestel viewdata service.
In the insurance sector the increased use of computers and VDUs as part of overall reorganisation plans may bring about job losses. Commercial Union plans to shed 1,200 jobs, and Prudential is cutting 400 jobs, all part of rationalisation and cost cutting exercises.

Retailing

Reports on automated retailing point to an increase in the use of new technologies; by 1987 most supermarkets will be using electronic cash registers or POS terminals, with Tesco as one of the main chains planning to use laser scanners. Tesco is also looking into the potential for teleshopping following an experimental scheme for the elderly or disabled: one report, however, thought that home shopping using VDUs would be unlikely for several decades.

Printing

National newspapers are moving into the electronic library area; with both the Financial Times & The Times either starting up systems or considering data bases using the respective newspaper outputs. The Daily Telegraph is introducing computerised typesetting (with 15 % job reductions) and computer based photocomposition later on.

Robotics

British firms such as Sykes, the 600 Group, Evershed, are developing contacts with Japanese robot manufacturers enabling them to manufacture or market Japanese-designed robots in the UK, and Group 600's advanced manufacuring process (SCAMP) involves the use of Japanese robots. British robots are also being sold to Japan, though, by Pendar robotics. The American firms Unimation is increasing its investment in robot development, while IBM is to market an advanced robotic system for light assembly in the UK. Meanwhile two UK-based robotic firm went into receivership, Renek (taken over and slimmed down) and Mouldmation. Contrasted with their American and Japanese robotics connections, British firms so far appear to have developed few agreements with other European companies in the field.

Telecommunications

As already indicated the Government has given the go-ahead on the development of two way cable television on the basis of the Hunt report published in October 1982. The whole debate on cable television was initiated by the report "Cable Systems" recommending the private expansion of local cable TV networks, published in March 1982 by the Government's Information Technology Advisory Panel, largely made up of representatives involved in cable companies. British Telecom, the Post Office Engineering Union and the TUC opposed this line in evidence to the Hunt Committee during 1982. The main Hunt recommendations were for the establishment of a central cable authority offering franchises based on competitive bids, no limit on the number of channels offered, the same decency standards as applied to current broadcasting, cable systems to carry all existing television channels, freedom to advertise and restriction on exclusively sporting events.

British Telecom (BT) viewdata service Prestel is expected to gain a mass home market by 1984, if BT provide a cheaper consumer package and improved the quality of information. Moves towards home banking and shopping were made under the title Project Y which aims to provide free TV adaptors to selected households.

The use of radio telephones is likely to increase as a result of the Government decision to allow Racal-Millicom to undertake a national project, which is expected to cover 90 % of the population over the next 5 years, with the possible creation of 10 000 jobs overall. Similarly BT and Securicor could create a similar number of jobs through the establishment of a national cellular radio-phone service, possibly using Plessey technology.

System X digital telephone exchanges will become operational on all trunk routes over the next five years, with local systems covered by 1990. System X will be produced by GEC or Plessey.

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3.3 FEDERAL REPUBLIC OF GERMANY

3.3.1 Government activities

3.1 General Policies

In November 1983, the new German Government presented its proposals for a revamped research and technology policy in answer to a Parliamentary question.

The question was only partly concerned with research and technology, and the answer was restricted to the economic and investment aspects of the Government's policy. A complete policy statement will be brought out in the first quarter of 1984.

The Government's research and technology (R & T) policy is aimed at :

a) expanding and deepening scientific knowledge,

b) protecting the environment and natural resources, and humanizing working and living conditions,

c) increasing productivity and competitiveness.

The policy is based on a number of key considerations :

* R & T policy should be aimed at securing the future of the economy. The introduction of new technology, in particular basic electronics, communications, administration and industrial automation technology, is vital for the health of the economy.

* The policy should create more favourable conditions for R & D work and encourage scientific and economic innovation. Above all, it should support market mechanisms whereby innovation leads to greater competitiveness.
It must avoid centralized, bureaucratic decision-making and State interference in market-oriented industrial production.

* However, it is the State's responsibility to create the best possible environment for research, development and innovation.

Basic research should therefore aim at achieving greater efficiency and guaranteeing the international competitiveness of Germany in areas which yield above average results, i.e. areas of rapid knowledge growth.

An intelligent approach to improving R & D cooperation, systems philosophies spanning several technologies and speedier application of technical developments to products are all equally essential.

The Government sees the rather sceptical attitude of large sections of the population towards the introduction of new technologies as being due to :

1/ widespread concern about the possibility of jobs being lost,

2/ less willingness to accept radical changes in living and working conditions in all their aspects,

3/ lack of speed and decision in the past in dealing with ecological hazards and damage to the environment.

The Government feels that concern about job security and new job creation is best met by the market orientation of its R & T policy, which will boost employment by promoting economic growth.

The other two aspects are to be dealt with by a new environmental research programme and stepping up subsidiary research into ecological hazards and damage to the environment.

3.3.2 Nationwide TV cabling project

The cabling project announced by the Minister of Posts, Christian Schwarz-Schilling, is to be the biggest job-creation project of the next few years. The aim is to make it technically possible for all households to receive cable television by 1986. Given certain political conditions, programmes received will include private broadcasts, local programmes, wheather forecasts, cinema and theatre announcements, advertisements and foreign broadcasts in addition to normal broadcasts.

It will be the task of the State (which in practice means the Post Office) to provide the technical infrastructure for broadcasting speech, text, data and images.

Political wrangling has already begun over whether copper or fibre-optic cabling should be used. The advantage of using copper is that cabling can go ahead immediately, whereas the fibre-optic cabling favoured by the SDP offers greater capacity and can carry more functions.

Infighting has also started over the share-out of responsibilities, eg. who will be responsible for issuing licences for private broadcasters or subcribers to satellite broadcasts. Some Land governments are taking the attitude that control over the content of programmes can no longer be guaranteed if it is technically possible to receive broadcasts from other Länder. The governments of the different Länder are far from being in agreement on this matter - while those with CDU/CSU governments wants to licence private broadcasters, the minority of Länder with SDP governments are against this. The question now being discussed is whether the Federal and the Land governments should agree on a State Contract governing accessibility, selection, democratic control and pluralism of broadcasts, or whether instead they should agree on a "quota system" under which individual decisions will govern individual Länder.

3.3.3 Viewdata (BTX)

The introduction of viewdata throughout the Federal Republic began in Autumn 1982. Since this is a matter which affects the sovereignty of the individual Länder, the legal foundations have been agreed in a State Contract regulating BTX participation, payments, identification of data sources, responsibility for maintenance, presentation of opposing views, advertising, data protection and surveys.

The feasibility of decentralized home working using Teletex is now being studied in a pilot project. The idea is for jobs to be shared among a number of people working part-time at home. Various public institutions and private firms are taking part in the experiment, which is being sponsored by the Land government of Baden-Württemberg.

Teletex stations will generally be able to receive long texts without time limits, which will be retransmitted to their authors outside normal office hours using cheap call rates.

The experiment shows that electronic home working or "telecommuting" is now gaining ground in the Federal Republic as in other countries.

3.3.4 New technologies - statements by major social groups

Trade unions

The DGB (Deutscher Gewerkschaftsbund) outlined 4 requirements which it regards as necessary for dealing with the social consequences of new technological developments :

- Sociological impact studies of new technology. Society must have sufficient knowledge of the consequences which technological change will have for workers.

- Worker participation in the planning and introduction of new technology. Workers must play a more important role in both the planning and introduction phases.
  This will only be possible if industrial law and the internal regulations of companies provide for more worker participation.

- Securing of the right to work. Introduction of new technology must not result in the wholesale loss of jobs.
  This can only be achieved by a policy of government investment for qualitative economic growth. It will also be necessary to ensure that the increased productivity brought about by new technology is shared out in the form of shorter working hours.

- Humanization of work and improvements in the quality of life. New technology must give priority to humanization of working conditions and work organization and improvements in the quality of life enjoyed by workers.

A nationwide survey of rationalization in the steel industry carried out by the metalworkers' union, IG Metall, and extended to cover other branches of industry showed that the introduction of new technology in private industry and government is already far advanced. The union warned of the dangers which the interlinking of individual technologies could pose for workers.

Out of a total of 900 companies surveyed, the following picture emerged of the spread of EDP control systems (personnel information systems and industrial data acquisition) among the 431 metalworking companies in the survey :

Percentages of companies with EDP control systems out of a total of 431 metalworking companies. Breakdown by company size

No. of employees	Personnel information systems (%)	Industrial data acquisition
less than 500	14.9	66.5
500 - 999	20.7	75.9
1000 - 1999	41.7	76.2
over 2000	61.8	77.9
All companies	29.3	72.9

Employers

Employers' associations state that they have encountered opposition to the introduction of new technologies, which as they see has no basis in fact. This was the subject of a joint statement issued by the Federal Association of German Industry and the Federal Union of Employers' Associations (1).

This statement stresses that technical progress is vital for the German economy and society. Refusal to implement new technologies or even delay in their introduction would have unacceptable consequences. As the employers see it :

- It would hinder the necessary improvements in productivity and the development of export products. This would have lasting consequences for the German economy, resulting in the actual "destruction" of large numbers of jobs.

- There would be a structural break in the process of technical development which has formed the basis of industrial civilization in the Federal Republic over the last few decades. This would have serious consequences for the development of society.

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(1) quoted from "Arbeitgeber", the yearly report of the Bundesvereinigung der Deutschen Arbeitsgeberverbände 1983. Bergisch Gladbach 1983, p. 94 et seq.

The statement outlines the following priorities for managing technological change :

- investment measures aimed at increasing competitiveness and promoting the overall growth of the German economy. This is a key priority;

- measures to temper or avoid the unwelcome consequences of technological change, particularly social hardship, industrial health hazards and environmental damage;

- calming fears about new technology and making it more acceptable.

The statement views a national consensus on the uses of new technology as a sine qua non for managing the associated problems.

3.3.5 Collective bargaining

The following three examples concern collective agreements in which the introduction of new technology is linked to working conditions.

The management and works council of Thyssen Giesserei AG have agreed on the following conditions for installing and operating a special personnel information system known as PAISY:

- PAISY is to be used solely for calculating wages.

- A new agreement must be worked out before the system can be used for any other purpose.

- The works council will appoint two specialists to supervise the operation of the system in order to guard against misuse of data.

- Clerical staff employed in inputting data will only be subject to identity checks where this is necessary to control access to the system and comply with company regulations. They will not be checked or have their actions monitored in any other way.

A wage agreement concluded between the engineering firm Vögele and the metalworkers' union IG Metall includes the following conditions :

- In order to prevent management taking advantage of the introduction of new technology and other rationalization measures aimed at lowering differentials and saving wage costs, the wage agreement states that there should be no overall reduction in differentials. Such a reduction would occur if, for instance, the company took on more low-paid workers or made more high-paid workers redundant. The agreement also states that the company must provide for raising differentials by raising the level of job content and skills.

  Under the agreement, the company must see that job content gives workers the chance to maintain and improve their skills. Work content must provide training opportunities and stimulate the learning process. Workers must be able to use all their skills; deskilling through misemployment must be avoided.

  All employees, workers and salaried staff, will get a rest break of 5 minutes every hour to prevent work fatigue. A revision procedure will be set up to decide on claims for longer breaks for high-stress work. The time allowed for toilet breaks must be at least 3 minutes every hour. Rest breaks cannot be taken at the beginning or end of the working week, and cannot be added to other breaks.

After more than two years of negotiation, employees of Texaco (Germany) have concluded a new rationalization protection agreement. This is the first wage agreement to include provisions on early retirement. If jobs are lost through introduction of new technology, other technical changes or economic reasons, employees over 55 with more than 10 years seniority will receive a bridging pension in addition to the normal company pension.

3.3.6 Data protection

With the spreadof information technologies, the problem of data protection is increasingly becoming a matter of public debate. The discussion centres on two main issues : protecting citizens against misuse of personal data by the State, and protecting workers against misuse of data in personnel information systems.

Serious threats to data protection in general are feared by the Hessen Data Protection Officer, Mr. Spiros Simitis. In his 1982 annual report, Mr. Simitis claims that the function and supervision of data protection are being called into question by public opinion and the rapid development of information technology.

The current concept of legally-enshrined data protection, according to Mr. Simitis, is based on central data processing at large computer centres. However, more and more authorities are now carrying out data processing for themselves using powerful minicomputers and microcomputers, which are more difficult to control.

An even greater danger to data protection might come in the form of the planned Viewdata (Bildschirmtext) medium, whose users could link up at any time using integrated networks combining video screens, telephones and computers. With such systems, current regulations on data processing and citizens' rights to protection would be inadequate.

3.3.7 Research

Social research is being carried out in the Federal Republic of Germany in a wide variety of fields, such as telecommunications and information technologies in production, administration, labour and employment. This report is confined to two important topics : Viewdata and ergonomics.

Viewdata

Important information on the nationwide introduction of Viewdata (BTX) was published in the Autumn 1982. This concerned the BTX field test in the Düsseldorf/Neuss area, which started on 2 June 1980, with more than 1 500 private subscribers and over 600 firms and industrial undertakings as users. There are more than 1 200 programme originators, including many newspapers and magazine publishers.

Use of Viewdata is concentrated between 6 pm. and 8 pm. and between 10 pm. and 11 pm. The actual figures are as follows : 28 % of accessing is in the early part of the day, before 4 pm., 36 % between 4 pm. and 8 pm., and 32 % after 8 pm. The main uses of Viewdata are : current affairs and news; information on goods and services; and service and advisory information.

According to the survey, political news from Germany and abroad was the most commonly used feature, accounting for 70 %. Interest in local politics was less (about 53 %). There was also considerable demand for sports news (about 70 %).

In the commercial field, trial subscribers asked for information on goods and services (90 %) and product tests (77 %); there was less demand for household tips (44 %), opening times of public institutions (40 %) and information on legal and tax matters (39 %).

Two third of those surveyed in the Düsseldorf/Neuss area specifically asked for service and advisory information. After two years experience, the survey shows that definite preferences have developed. Users say that they select the pages of the print media (newspapers, magazines, book publishers and news agencies) more frequently than any other (72 %), followed by information on tourism and transport (36 %), consumer organizations (27 %) and banks and insurance companies (26 %).

Ergonomics

The "Industrial Ergonomics and EDP" project started at the beginning of 1982. The objective is to develop and test working aids and facilities, including suggestions from workers and unions on new concepts of ergonomic design in computer-aided information, planning, control and processing systems. The project includes the following fields :

- ergonomic assessment methods,
- computer-aided information and word processing,
- integrated EDP systems covering more than one field,
- work situation in data entry and checking,
- specific applications of EDP.

3.4 FRANCE

Government thinking on the social impact of the microchip revolution continued in 1982, with movement in some of the key areas beginning to pick up speed in 1983 :

- the reorganization of all segments of the electronic technology industry is pressing forward. Following Compagnie des machines Bull, Autumn was both Thomson and CGE restructuring major sections of their business. The Ministry of Industry, however, made the agreement subject to consultations with the workers in the companies affected;

- following the reshuffle of Government responsibilities of March 1983, the general supervision of the entire electronics industry was transferred from the Ministry of Industry to the Directorate General of Telecommunications;

- 1982 was the year in which the Government launched a wide-ranging discussion on how to re-energize research activities. 1983 has seen the first concrete steps being taken in this field. But the outstanding hallmark of 1983 will be its importance for training, which became the Government's number one priority area (1);

- the problems posed by the introduction of new technology in industry are also coming increasingly to the forefront of public attention.

3.4.1 GOVERNMENT INITIATIVES

Promotion of Research and Development

Following a period of wide-ranging discussions and consultations, the Government crystallized its thinking on the general directions of future research in 1982. That policy was given statutory force in the Law on Research Guidelines and Programming, adopted by the National Assembly on 28 June 1982. The Government has articulated its future strategy around four key elements : advance programmes, basic research, applied and application-oriented research, and technology development programmes.

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(1) As evidence in all the public statements made by President MITTERRAND

The fusing of the Ministries of Industry and Research into a single central government department at the end of 1982 was a reflection of the growing concern with transferring the results of research to industry.

This had three practical effects at regional level :

- regional associations were set up;

- research, training and technology delegates were appointed for each region to sit on Regional Councils;

- a Regional Advisory Committee on the Research and Development of Technology (Comité Consultatif Régional de Recherche et Développement Technologique - C.C.R.R.D.T.) was set up to define and help develop focal points of technological research and multi-annual programmes centred on regional concerns.

The job of the Délégation Régionale à la Recherche et à la Technologie (D.R.R.T. - Regional Delegation for Research and Technology) is to coordinate the work of the regional sub-units : ".. The D.R.R.T. has the power to organize transfers of technology to industry in liaison with workers, management, regional authorities and the Ministry of Research and Industry".

The Government is planning to put its ideas into specific actions. Among the advance programmes are two firmly rooted in the disciplines of information technology :

- the programme for controlled development of the electronics-based technologies sector. This will form part of the task of the commission headed by A. FARNOUX;

- the programme for technological development of the country's industrial fabric.

Work began on these two programmes at the beginning of the year. Altogether, the Government is contributing FF 7 million into the projects via ANVAR - (Agence Nationale pour la Valorisation de la Recherche - the national agency for the development of research) and the Fonds de la Recherche et de la Technolgie (Fund for research and technology).

The French Government decided to invest a total of FF 6.5 million in research and development in all segments of the electronics industry in 1983. The "Mission filière électronique", (electronic infrastructure Commission) as it is called, predicts that the new technological infrastructure will help create 200 000 new jobs and help the country to a FF 30 billion trade surplus. The five-year plan of action to bring this about (Plan d'Action de la Filière Electronique - P.A.F.E.) will raise the annual rate of production growth in the electronics-based technologies sector from 3.1 % to 9 % by 1986 to reach in the final year a gross output value of FF 170 billion. The total cost of the Plan is FF 140 billion, 55 billion of which will be put up by the State.

The difficulties already experienced in transferring the results of new technology research into industry spurred the Government on to set up 6 national projects in the advanced technology sector :

- Very Large Scale Integration (V.L.S.I.) in computer-aided design;
- Computer-aided design and manufacturing;
- Software engineering;
- Computer-aided translation;
- New image processing technologies;
- Minicomputers for scientific and industrial applications.

In 1983, the Agence de l'Informatique (ADI - Information Technology Agency) also launched 3 new research support programmes within three projects :

- ESOPE - computer-aided translation;
- ASQUEL - software quality assurance;
- SIPION - computer-controlled manufacturing system.

Education and vocational training policies

In 1982, the 'Mission filière électronique' had stressed that inadequate job-related training would prove to be the single greatest obstacle to the orderly development and introduction of electronics-based technologies in French industry and commerce. The backlog in training could rise as high as 400 000 by 1986.

Since the beginning of 1983, the general discussion in this area has received a further stimulus, but a concrete plan of action has also been defined at the initiative of the government.

a. Basic level training

The Ministry of Education has outlined a three point plan, focused primarily on :

- use of and training in new information technology at all levels of education,
- training teachers how to use computer technology
- increasing specialist training opportunities

The practical results of the first programme came with the massive upgrading of the programme to put 10 000 microcomputers into French classrooms. The target is now 100 000 micros by 1988. The true extent of the gap to be bridged on this front can be judged from the current state of play: at the time of writing there are 6 000 microcomputers in operation in 4 000 schools and colleges nation-wide running on 400 to 501 programmes written between 1970 and 1975. 50 % of these are becoming out of date.

The second keystone of the Government's strategy was laid in April 1983. The Ministry has set itself a target of having 20 % (or 100 000 out of the present 500 000) of the country's teachers trained in the use of microcomputers by 1988, with 1 000 teachers being earmarked for more in-depth training.

Hand-in-hand with this will go a drive to redress the shortage of computer specialists in industry, where it is estimated that around another 1 100 engineers and 3 000 highly-skilled technicians are needed. Towards the end of 1983, a plan was brought in with a target to train 3 000 engineers, 2 700 engineer-equivalents with skills in both fields and 1 500 highly-skilled technicians.

The Centre d'Enseignement et de Recherche en Informatique, Communication et Systèmes (CERICS), a training institute in software engineering (set up along the lines of its American university counterparts by the joint efforts of the Nice Chamber of Commerce and Industry and Compagnie des machines Bull), aims to train 30 top-grade software engineers in 9 month, who will then be capable of developing complex problem-oriented software for the leading computer manufacturers, software houses and end-users.

To complement these initiatives, six new technical A-level courses (Baccalauréat) are being set up, together with a Brevet de Technicien Supérieur (BTS - higher technical certificate) in industrial data processing.

The Agence de l'Information (ADI) and the Ministry of Education have also been hammering out an outline agreement to equip grammar- and high-schools with computer facilities, and to design a 'nanocomputer' likely to cost somewhere in the region of FF 2 000 to FF 5 000.

The Ecole Nationale Supérieure des Télécommunications (a higher education institution awarding degrees in telecommunications) has recently restructured a computer-aided learning system comprising a videotex databank known as SAVANT (Système d'Assistance Visuelle à l'Apprentissage de Notions Théoriques - or the visual aid system for teaching abstract concepts) to enable interactive tutorials to be held in real time. Among the software houses, STERIA has recently started to produce educational technology packages to enable educators with no grounding in computer technology to use computer-assisted interactive techniques.

b. Vocational training

Technical and vocational initiatives have not been forgotten either. Between 1983 and 1985 some 1 100 engineers or the equivalent, and 3 000 highly-skilled technicians holding a university degree in technology or the equivalent will be turned out of the country's vocational training system. 100 instructors and 1 000 workers representatives will also receive traning in computer-based occupational skills.

The Association pour la Formation Professionnelle des Adultes (AFPA - adult vocational training association), whose 140 centres provide training for some 80 000 people a year in 260 specialized fields, embarked on a 18-month plan to set up its own distributed data communications network in 1982. The aim is to further decentralize the Association's organizational structure and streamline its clerical procedures. This will have a direct impact on the Association's training activities. So far, it has been training only around 600 students a year for careers in the data communications field. Now, its own computerization has paved the way for training courses in applied computer technology for the service industries.

The reason for AFPA's decision to move towards a distributed technological infrastructure is partly to be found in its collaboration with the national manpower services agence Agence

Nationale pour l'Emploi (ANPE). AFPA has recently put the finishing touches to a proposed scheme for a videotex service, with the help of the Centre d'Etudes des Systèmes d'Informations dans l'Administration (CESIA - a research centre into administrative data communications systems). The new service is designed to help jobless people looking for retraining to book a place on the course of their choice in a selected training centre via a MINITEL terminal.

After close consultation with the "Mission filière électronique", AFPA produced its own robotics/office automation plan in 1983, which will enable it to offer training facilities in these emerging skills to ten times the number of students at present catered for.

In the field of office automation AFPA, along with others, has been observing a steady decline in the number of students placed in secretarial and bookkeeping jobs - principally because clerical and office studies training courses failed to train students in the use of modern data-handling technologies. AFPA resolved to plug this major gap in the effectiveness of clerical training by introducing courses on modern office technologies into the established curriculum.

The 400 teachers and lecturers currently employed on teaching non-advanced business studies will need retraining. Lecturers in secretarial studies, shorthand, typing and bookkeeping were all to receive 3 to 5 weeks training in the use of new office technologies ready to begin teaching the revised currucula from September onwards.

AFPA calculated that, by the end of 1983, its reshaped activities would give it 120 teacher trainers. The total FF one billion cost of the operation will be split between 1983 (30 %) and 1984 (70 %).

Over and above training the unemployed, AFPA will also be looking to develop in-service booster training for private industry. Office technology training courses will also be available to teachers from secondary education and university and college lecturers.

The long-term objective is to set up 270 courses of 16 to 20 trainees each

AFPA will also be investing FF 2.5 billion in computer-aided learning during 1984 in the form of experimental projects in the clerical, electricity/electronics and general engineering fields.

Among the specific spin-offs of this will be the creation of 12 jobs in each sector for educational software engineers.

On 26 January 1983, the Council of Ministers announced a number of initiatives to train young people between 16 and 25 in modern data-handling technologies. The training will be carried out on a voluntary basis by computer engineering graduates from France's colleges of advanced technology while on their compulsory national service. Training centres will be set up in 200 towns and cities, and 2 000 teaching posts are to be created. Each volunteer teacher will be responsible for training 10 unepmloyed young people and each class will have its own microcomputer.

c. Introducing micros to the public

The Centre Mondial pour les Usagers sociaux de la Micro-Informatique (World centre for non-professional microcomputer users) opened up 200 computer workshops throughout the regions during summer 1983. The Centre started off with an operating budget of FF 10 million to equip the entire network with 2 000 microcomputers. Supervision of the workshops is devolved to the relevant regional authority (prefecture). The aim of this innovation was described by Jean Jacques SERVAN SCHREIBER as being "to give young French people access during summer to workshops where they can gain experience of microcomputers, free of charge and without restrictions on time..".

An initial stocktaking of the scheme revealed that it had proved less successful that hoped for. So far, only a few training courses actually got off the ground, although, in general, those taking part (schoolchildren, unemployed, managers of smaller companies) found them worthwhile.

Public administration and computer use

Central government departments make use of data transmission facilities through the services provided by the Centre d'Etudes des Systèmes d'Information des Administrations (CESIA - 1983 budget, FF 44 million).

In the videotex applications field, CESIA has already set up two databases of administrative information - one on citizens' rights and a guide through the maze of administrative procedures, the other for the CLAIRE project in Grenoble.

Even some administrative procedures are affected, paper giving way to electronic methods of transferring information. Two prime examples are the Transferts de Données Sociales (Social Data Transfer)

and Centre de Formalités des entreprises (Business Procedures Centre) schemes. Both projects are concerned with the statutory obligations of companies to submit written returns on employment and wages. The social data transfer scheme is open to large companies already equipped with computerized administration systems (34 companies - 1 500 employees). Their statutory returns are recorded and transmitted on magnetic tape. By 1986, the scheme will be extended to all companies with computerized pay-roll procedures, covering some 6 million employees. The Business Procedures Centre experiment aims to cut through much of the administrative red tape faced by companies when starting up or winding down business operations. A pilot test is currently under way in the department of Loire-Atlantique. The various distributed networks in the system linking to business procedures centres to the relevant administrative departments is also due to be computerized during 1983.

"Computer-on-a-chip" technology is also being harnessed to the service of decentralization. CASIA has set up a programme described as an information system for rural municipalities as a means of helping local government and business to organize its documentary information activities.

As far as computer-aided manufacture is concerned, there has been a temporary setback in the plan which was scheduled to follow the so-calles "Mission robotique" (Robotics mission). Priority measures to boost the spread of computer-aided production have been announced, however. This is in line with the publication of Philippe Lemoine's report on policies for the application of computer technologies.

The central premiss of this report in that the pace of technological innovation throughout the social and economic fabrics of France is flagging. It also argues that the steps taken by the Government to intensify the introduction of technological advances have, in fact, often been counter-productive.

In common with all its industrialized partners, France suffers from a too-widely dispersed decision-taking base. The administrative machinery through which the policy of diffusion is implemented comprises four key agencies : the ADI, CESIA, ADEPA and the "Mission à l'Informatique". That fact, together with the 30 other public and semi-public agencies involved, provides plenty of scope for bottleneck upon bottleneck.

The machinery needs reorganizing. The report identifies three priority needs :

- a Haut Commissariat aux Technologies de l'Information (High Commission for Information Technologies) should be established under the aegis of the Inter-Ministerial Committee for the electronics sector, with a budget of FF 500 million from the budgets of the four key agencies,

- the existing four agencies should be replaced by four new ones, each with specialized responsibilities for identified sectors. These would be :

  - an agency for public administration information systems,

  - an agency for electronic production and information technologies for smaller industrial concerns,

  - an agency for major companies and service industries,

  - an agency for education and communication technologies.

Finally, the report proposes that hardware supply should be deregulated and replaced by free bargaining between equals. Administrative agencies and private industry would conclude medium-term (say, 3 to 5 year) contracts with the Commission regulating both the technical and social aspects of computerization.

3.4.2 MANAGEMENT AND LABOUR

With the coming into force of the Auroux Law on 28 October 1982, workers' representatives in companies employing over 300 employees have been put on a much firmer footing to negotiate with management over schemes to computerize work. The Law stipulates that employers must inform and consult Works Councils before bringing in any major plans to introduce new technologies likely to affect employment, skills, wages, training or working conditions.

The Works Council can also call on the Health, Safety and Working Conditions Committee to carry out studies on its behalf. Both can call on the services of an expert either at the company's expense or paid for by the Works Council out of a new fund created by the Law.

Article L 461.1 of the Law concerning the rights of employees at work (passed on 4 August 1982) provides that "employees shall have the right to express their opinion, directly and collectively, on the content and organization of their work, and on the definition and implementation of actions intended to improve working conditions in the enterprise". A C.F.D.T. survey found that anything related to new technologies topped the list of workers' concern.

The fourth and final bill in the composite Auroux Law was voted through by the National Assembly on 24 November 1982. It provides for a Health, Safety and Working Conditions Committe to be set up in all companies employing more than 50 workers (more than 300 workers in the construction and public works industries). The Committee will consist of the Works Manager or his representative and workers' representatives appointed by a board comprised of the elected members of the works council or joint staff committee and workers' representatives.

Union attitudes

Over the past fifteen to eighteen months, the C.F.D.T. has been busy examining the implications of the Auroux plan. It has also put out a number of detailed recommendations on office automation procedures.

While recognising the new Law as an important landmark in the field of workers' rights, the C.F.D.T. regrets that the powers of the works council were not strengthened. At present is has only a consultative role. The new Law imposes a number of general duties on employers, but, in the C.F.D.T. view, did not go far enough on matters of detail. It failed to provide, for example, that those affected by the introduction of new technology should be informed of the broad guidelines of the plan.

The C.F.D.T. magazine "Cadres-C.F.D.T." has also published a special report on office automation, putting forward a series of proposals.

By 1985, more than one million men and women will be working at visual display units. But many who have already started working on VDUs have complained of a variety of illnesses linked to their work. The C.F.D.T. therefore sees it as essential that workers and unions should exert strict control over the use of VDUs in order to :

- forewarn (by negotiations on job restructuring),
- monitor (day-to-day working conditions of those using VDUs),
- remedy (the adverse effects of working at screens).

The C.F.D.T. put also forward some proposals on man-machine interfacing. "The 20 points listed are not to be taken in isolation one from the other; they are all interconnected". But they are not to be taken as an exhaustive checklist. Job enrichment depends on achieving the best possible balance between the functions allocated to the machine and the worker. And as each worker is an individual, all factors must be taken into account in each case.

The Confédération Générale du Travail / Force Ouvrière has recently published a booklet on robotics in the factory. The aim is to increase awareness among union activists about the introduction of robotics.

CGT/FO accuses employers of using the difficulty of assessing the impact of new technologies on employment as a ploy to resist negociations on the introduction of new technologies.

The union therefore sees an interindustry agreement as the only solution. It advocates an outline agreement as part of a planned policy to preserve jobs, accompanied by job-related retraining opportunities.

The Groupe de Stratégie Industrielle "automatisation" (Industrial Strategy Group on Automation - G.S.I.), a tripartite body comprising representatives from the Ministry of Research and Industry, employers' organizations and trade unions, was set up by the General Planning Commission as part of the preparations for the Ninth Plan. Its conclusions are set out in three publications :

- the first dealing with the problem of deskilling caused by new technologies,
- the second examining the content of available training in information technology and robotics,
- the third dealing with the impact of information technology on employment opportunities.

The G.S.I.'s Report No 3 advocates a number of steps :

- publication of a guide to microelectronic technology for company heads,
- amendments to the Auroux Law of 28/10/1982 regarding the information to be given to Works Councils,

- compilation of coherent national statistics in this field.

A wide measure of agreements also emerged from a discussion organized by the Convention Informatique (the Information Technology Conference) on the problem of computerization, automation and training.

3.4.3 RESEARCH AND STUDIES

Two reports : 'Research-image' and 'Technology, culture and communication'

The aim of these two fact-finding reports was to clarify government action in the field of audiovisual technology. The former report, by Henri Fabe and Yves Stourdze, is concerned with the various aspects of image synthesis and processing. The latter, by Armand Mattelard and Yves Stourdze, deals with emerging indicators in the field of communication.

The report on image processing has been endorsed by five central government departments - the Ministries of Research and Industry, Communication, Culture, Posts and Telecommunications, and Education. It is an overall survey of the probable future development of research into image processing technology. The first part of the report reviews the industrial applications, which, it claims, are characterised by "wide dispersal resulting in internal competition".

The report proposes an "image technology plan" with a strategy articulated around two key objectives :

- coordinating and strengthening existing research potential,
- developing applications systems and software tailored more closely to known user requirements

Together with this, 5 regional image technology development centres will also be set up, to enable research laboratories to interact with manufacturers, applications specialists and, in three cases, training facilities. FF 45 million is to be invested in research activities alone - FF 30 million of which will go to operating expenses. Overall, some FF 84 million will be sunk into the development of audiovisual technologies.

The second report on "Technology, Culture and Communication" goes far beyond the concerns raised by information and electronic-based technologies alone. It takes a long, hard look at the limitations and failings of scientific research into communications generally.

One examples it takes is the fact that we simply do not know, or at best, have an imperfect grasp of, what impact new technologies such as computer-aided learning will have on education, or videotex services on culture.

The basic premise of the report is that we need "an institute for research into technological aspects of communications and culture". It would actively involve the various central government departments and would be organized into 4 units dealing with the economy of communications systems, the right to information, analysis of the international situation, and tracking of research and development programmes in industry.

3.4.4 SOCIAL PROJECTS

From 13 to 20 October 1982, the Institut pour le développement et l'aménagement des télécommunications et de l'économie (IDATE - Institute for development and improvement of telecommunications and the economy) staged in Montpellier its fourth international Forum on social experimentation in information technology. The Institute carries out research into the socioeconomic impact of new communication methods through a series of on-going field tests. This particular colloquium focussed on how existing services could be improved, what shape new services should take and how users felt about them. A hundred specialists from all over Europe, the United States, Canada and Japan described experiments in progress in their own countries.

France is now making great strides forward in the information technology field, moving on from experimentation to diffusion of services.

The telecommunications authority (P.T.T.) announced that its Teletel commercial service would be brought into operation in the autumn. Users will be able to access the videotex information centres using Minitel terminals and the Teletel network. 20 000 Minitel terminals will soon be installed throughout France for business use. The principal users are expected to be banks and financial institutions, the press and publishing, farmers, and major manufacturing and commercial companies. Altogether, these four sectors will account for about 50 % of all services. Two other potential growth areas for this service are health care and education. The objective was to have 80 000 to 100 000 units installed by the end of 1983.

Computer-based information for business will soon be matched by electronic services through the TV set. All French households will be linked to cable TV systems by the end of the century.

By 1986, 1.4 million families will be wired up for normal TV entertainment, the telephone, broadcast and interactive videotex, as well as two-way local television programmes. The scheme will cost the P.T.T. FF 5 billion over the next 3 years. The plan to wire up the nation will demand FF 4 billion a year from 1986 onwards.

But the principle focus of new technologies remains young people.

The aims of the new project, 'Réseau X2000' currently being researched by the Agence de l'Informatique, were defined by J.P. Chevènement as "Setting up across the length and breadth of France, within two years, 1 000 resource centres where associations, clubs and organizers can use, or from which they can obtain, microcomputers, software, educational software, etc... together with the supporting documentation needed to be able to use them".

By the end of 1984, the 'La Belle de Mai' quarter will be equipped with 1 000 microcomputers. They will be installed, on request, in the main public buildings. At the time of writing, 40 are already up and running. The full complement will be 500 micros at a total cost of FF 4 million.

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3.5. ITALY

3.5.1 Government activities

Promotion of Research and Development

Recent events in the field of R & D are a continuation of ongoing programmes; they concern the Ministry of Scientific Research and the National Research Council (C.N.R.).

A research staff under the coordination of the Ministry for Scientific Research has presented a "National Programme for Research in Microelectronics" ("Programma nazionale di ricerca per la Microelettronica"). This programme is consistent with the requirement established by Law 46 of 17/2/1982 on Technological Innovation, which assigns public funds up to 1 700 billion LIT for industrial R & D innovative sectors. It concerns almost exclusively the Electronic Components Technologies and is mainly based on development strategies by SGS, the only national producer of integrated circuits in Italy. The fundamental objective is said to be the definition of projects and joint-ventures allowing a "vertical integration at a national level between firms producing components and those producing systems within the larger frame-work of the development of non-standard products and systems". Analyses and forecasts for the Italian market of electronic components are provided, and "accessible areas" for the national industry are defined. Total allocation of funds for R & D projects is 210 billion LIT, of which 10 billion are to be directed to extra-firm training projects within Universities.

Further programmes defining goals and allocation of funds are announced for other "production lines" such as telematics, defence electronics, and office automation.

The present programme is, for the moment, the first concrete initiative which explicitly emphasises the preservation of independent research, development and production of LSI components and related technologies in Italian industry.

The achievements attained so far by the "Applied Research Project on Information Technologies" (Progetto Finalizzato Informatica) of the C.N.R. (National Research Council), launched in 1979, were made public in a conference held in Rome (20/6/1983).

The project, whose budget in 1982 amounted to 15 billion LIT, is based on a network of research centres, universities, public and

private firms, and is articulated into three subprogrammes : Architecture of Information Systems, Information Technologies for the Public Administration, Automation and control of Industrial Processes.

Among the individual projects, the most ambitious one from a financial point of view, CNET, has led to the realization of a pilot project of local network for the processing and transmission of information, which includes the development of a unified system of transmission of data, text and voice and the development of software for the standardization of data entry and communication systems. The METOD programme, coordinated by the Institute of Cybernetics of the Polytechnic of Milan, has defined a "National Methodology for the Production of Software". These methods should constitute the basis for an experimental "Automated Software Factory" which should be realized in 1983/1984. The programmes aimed at the specific needs of the Public Administration have sometimes been criticized for having produced less substantial results; however, methologies and examples of applications have been achieved : DATAID programme on the design of Public Data banks is being applied to the development of the Information Centre at the Prime Minister's Office (Presidenza del Consiglio); the programme LAVORO has produced a model of an information network for the monitoring of the labour market at regional and subregional levels, centered on the "Regional Observatories of the Labour Market", with one application in Lombardy; models of the local managements of the Health Service have been developed and they should find experimental applications in 1984 with the agreement of the regional authorities in Liguria, Tuscany, Apulia and Sicily. Within the programmes on industrial applications, the main achievements consist in the development of CAD techniques and software.

On the other hand, the C.N.R. project on Robotics, for which a preliminary feasibility study was disclosed, will not enter an operational phase until 1984. Funding of 60 billion LIT should be available for this project in the period 1984/1988. The delay in the definition of programmes and in the assignment of funds is considered to be a serious handicap for the further development of Italian research on Robotics, which was considered as being very promising by international standards.

Industrial Policy

An important document on Industrial Policy has been published on the initiative of the Parliamentary Commissions of the Chamber of Deputies. (1)

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(1) Camera dei Deputati, XII Commissione : "Relazione sulla politica industriale e i problemi dell'innovazione nell'evoluzione del sistema industriale e in relazione alla legislazione vigente", Roma 1/10/1982.

It is a critical review of legislation and achievements in industrial policy in the past ten years, based upon a series of informal hearings between members of the Parliamentary Commission, and representatives of industrial and institutional bodies. A complete list of legislation and regulations in the fields of public support to industry (incentive schemes, financial and tax provisions, etc. ..) is included in the document. The main recommendations of the Commission concerning new technology are the following :

- The need for an industrial policy with a strong priority towards innovative sectors ... such as telematics, robotics and optical fibres ... and for separating legislative and financial instruments for innovation policies from other interventions such as sectoral policies for reorientation;

- promotion and diffusion of technological innovation, in particular in the area of small and medium-sized enterprises, to be carried out with special financial incentives, and the creation of a National Agency for the coordination and promotion of technology transfer;

- planning of public sector demand, in strict coordination with firms' investment programmes;

- reorganization and redefinition of programmes for Public Agencies engaged in research activities.

The financial law of 26/4/1983 defined the amounts of funds available for the enactment of the legislation of financial incentives for industry and research concerning technological innovation in 1983 and subsequent years. (details are given in the Table hereafter).

LAW	PERIOD OF OPERATION OF THE LAW	FUNDS ORIGINALLY APPROPRIATED	FUNDS SPENT	TOTAL REFINANCING	OF WHICH FOR 1983
		(billion LIT)			
Law 675/77 "Law on the reorganization of indust. plants"	Originally 1977-1982 extended to 1994	3745	3745	5300	450
Law 46/1982 "Fund for technological Innovation"	1981-1984	1600	1130	350	350
Decree 902 "Contributions to small size firms for the modernization of plants".	1976-1988	1200	800	-	-
Law 83/1982 "Contributions for the sector of electronic consumption goods".	1982-1984	200	200	150	150

Source : Our calculations on the basis of data provided by the Chamber of Deputies.

The period of applicability of the Law 675 was extended for 12 years from its original 1982 deadline. Meant to finance the restructuring and reorientation of industrial plants towards more advanced sectors and processes, the funds used by end 1982 have been mostly absorbed by declining sectors in heavy industry. Electronic industry accounted for a meager 3 per cent of the total financing.

Law 46 of February 1982 finances research and development in technologically advanced projects. Its original endownment of 1600 billion LIT is widely considered to be insufficient, as the demands for funds have run to over 4 000 billion LIT.

Projects for about 700 billion LIT in electronic-based industries have been given preliminary approval by the Ministry of Industry:

applications are mostly in the field of automobile production and components.

The crisis of the Italian consumer electronics industry continues to be a considerable matter of concern. After one year of uncertainty and of Trade Union action in defence of workers made redundant in this sector, the Ministerial Committee on Industrial Policy (CIPI), in its meeting of 8/6/1983, approved the plan for the creation of the holding company REL-Zanussi-Indesit for the reorganization of the industry of electronic consumption goods, under Law No 83 of 1982. This plan assigns an initial capital of 60 billion LIT to the new holding company, with public share by REL of 45.84 per cent.

As for the employment prospects, some 2 000 workers out of 3 000 employed in the existing plants are likely to be absorbed within the new group, leaving some 1 000 workers eventually redundant.

Education

According to the Ministry of Education, out of a total of 1274 State's technical secondary schools (ITS), 113 were, in 1981/1982, providing courses on information technologies, for industrial or commercial specializations.

Some pilot projects are also organized by local Authorities, such as the courses provided by the Province of Rome and addressed to general secondary schools (Licei), and vocational training programmes organized by the Lombardy region.

In spite of these and other initiatives, the effective level of introduction of computers in the Italian educational system remains modest. The data presented at a round table on "School and Computer" revealed that Italy had absorbed only 0.2 per cent of the total sales of personal computers for educational purposes in Europe. The necessity of generalizing the organization of classes in Informatics in secondary schools (both technical and Licei) was stressed at the meeting.

Courses for the training of blind persons in informatic skills are organized in Bologna by the Association for the professional training of handicapped persons, which also held a conference in May with a survey of European experiences in this field.

Labour legislation

Regional experiments, such as the Piedmont experience of reallocation and retraining of redundant workers ("mobility lists") continue.

In Lombardy an Agency "Lombardia Lavoro", whose shareholders are the Region and the Chambers of Commerce, has been created. In cooperation with the regional body which monitors local labour market trends ("Osservatorio regionale sul mercato del lavoro") and the services engaged in training programmes, the new Agency should provide, through specialized centres, the dissemination of notices on job opportunities and training facilities within the regional area.

Data Protection

A Commission set up in 1980 by the Ministry of Justice ("Commissione Mirabelli") has presented an extensive report, and its proposals for a draft law, with the aim of providing a comprehensive framework for regulating the protection of individual liberty and of the right to privacy vis-a-vis the collection of personal data through data processed files.

It is the first attempt to provide specific legislation on this issue in Italy, although other legislative acts in operation, namely the "Statuto dei Lavoratori" of 1970, concerning workers' rights in the workplace and the "Nuovo ordinamento della Pubblica Sicurezza" concerning administrative rules for the Police and security, contained implications and limitations for the collection and filing of information on persons. "Statuto dei Lavoratori", for example, forbade the control of workers through distant monitoring devices and the collection of files on "personal characteristics" of workers by management.

The proposed legislation states in principle the "freedom of data collection", with no pre-determined limitation; privacy and individual freedom is defended by article 10 which establishes that the collection and processing of data concerning race, religion, political opinion, participation in Unions or other activities etc., requires the previous consent of the person interested.
In addition, the individual is guaranteed in article 13/15 the right of access to information concerning himself contained in a data-bank. Such guarantees would not apply with respect to the Centre of Data Processing of the Police Administration, and the disclosure of personal data would always be permitted on request of a Public Authority for reasons of criminal investigation.

3.5.2 SOCIAL GROUPS

Trade Unions and Employers' attitude with regard to the decrease of Industrial Employment

Faced with the continuing deterioration of employment levels and with the employers' refusal to sacrifice efficiency for social considerations, the Unions start to realise that the demands they put forward in the past few years, such as the ones for an active labour policy, for a strategy of industrial promotion and more in general for a growth policy "appear to be more ritual than operational" (1). Some longer-term proposals are thus emerging, such as the one of guaranteeing some form of "minimum income" to young people in search of first employment. More radical proposals are the ones expressed by A. Lettieri, a former secretary of the FLM (Metal/engineering Union Federation) (2), who puts forward the idea of a redistribution of the effective labour requirements. This could be based on yearly programmes concerning production trends (the possibility for which is offered by the first part of the collective agreements); according to such programmes the available work would be redistributed among all workers by reducing individual working time. Such a scheme of "flexible redistribution" is considered preferable to a straightforward cut in working hours.

Collective agreements

The negotiations for the national collective agreements for industrial workers, many of which should have been concluded by the end of 1982, were interrupted for a long time due to two main controversial issues : the first one was the employers' request to obtain, as a precondition for signing the agreements, the definition of global measures of macroeconomic compatibility for wage increases and a change in the clauses of automatic cost-of-living indexation; the second one was the unions' request for a reduction of working time.

Two important collective agreements were nevertheless signed in 1982, for printing workers and for the banking sector respectively; the latter in particular was reached after long strikes, which disrupted the banking services and caused much public concern.

The printing workers' contract is perhaps the most explicit example in Italy of "New technology agreements" where the introduction of new technologies is negotiated along with the definition of occupational guarantees. The present contract states the right of the Unions to prior information and bargaining on the introduction

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(1) From the opening report by E.Mattina at the Directive Committtee of the CGIL-CISL-UIL Federation, Rome 20/10/1982.

(2) In an interview published in "Rassegna Sindicale", 25/11/1982.

of new technologies, determines the ways of dealing with possible redundancies, with mobility and retraining of the workers affected, and defines some rules for the transmission of fac-simile reports. With respect to the previous contract 1979-1981, there has been a relaxation of some of the norms which limited the direct keying-in of texts by journalists through text-editing terminals, while additional guarantees have been obtained for the preservation of employment levels in establishments utilizing fac-simile transmission devices.

As for possible reductions in employment, compulsory dismissals are said to be avoided, with resort of natural turnover and incentives for early retirement. For the first time, it is mentioned in a contract the possibility of opting for part-time work (only for clerical workers). A 36 hour week has been established as a norm (6 x 6) with a consequent reorganization of shift-systems.

In the agreement for the banking sector the objective of the reduction of the working week to 37 hours within the contract period has not been met. At the beginning of the year, bank management should make available ex-post all specific information on manning levels, employment trends, turnover, distribution among productive units of newly hired workers, availability of retraining courses and number of workers involved, number of hours of overtime worked, etc.., concerning the previous year. As far as "Technological innovation and important processes of reorganization" are concerned, the bank management should give prior information to the coordination structure of the Trade Unions.

The long-lasting controversy on the structure of wages and the change in the automatic wage - indexation scheme ("Scala Mobile") was finally settled by an agreement signed on 22 January 1983 by the Employers' organisation and the CGIL-CISL-UIL Confederation, setting indicative limits to yearly rates of wage increases for the period 1983-1985, and establishing the framework for a gradual reduction of working time.

Following the January settlement, a few collective agreements were successfully concluded in the following months (chemicals, engineering workers in state-owned enterprises).

The collective agreement for metal and engineering workers in the private sector (Contratto metalmeccanici; it concerns more than 1.5 million workers) required however a few more months of industrial conflicts to be concluded (1/9/1983). The ground for dispute was the reduction of working time, considered by the Unions as closely linked to the defence of employment levels, and viewed by the employers as having an impact on competitive positions; a compromise agreement was eventually reached.

The settlement of the collective agreement has not ended problems of industrial relations in the automobile sector, the main problem being the employment level in Fiat.

Since 1980 Fiat has reduced its total work-force by nearly 50 000: of these about 20 000 went out through natural turnover and early retirement schemes; the remaining part has been, in practice, indefinitely laid off while receiving "Cassa Integrazione" payments. Attempts to reduce this supply of redundant workers through recourse to priviliged schemes of placement in other jobs ("liste di mobilità") or through retraining schemes have been largely unsuccessful, because of the general depression of the labour market. At present, the main problem is the fate of about 18 000 laid-off workers, that the firm declares to be unable to reinstate, contrary to the original agreements. The Unions have proposed, without much success, the introduction of forms of "sharing" or "rotation" of the reduction in hours, "solidarity contracts" for the reabsorption of lay-offs and alternative forms of redistribution of short-time work among all workers.

Market trends are invoked to justify the reduction of employment; but the fact that Fiat is now producing about the same number of cars with 50 000 fewer workers than four years ago should remind us of the possible role of technological change in industrial plants.

3.5.3 EXPERIENCES IN SPECIFIC SECTORS

Market Trends for Computers

From a recent report on market trends for computing equipment in Italy prepared by Honeywell Italia S.p.a., the evidence emerges of a continuous expansion, which has not been negatively influenced by the general stagnation of economic, and in particular, industrial activity. Expenditure on hardware purchases increased by some 23 per cent in 1982, reaching a total of 3 600 billion LIT. The seven major producers of hardware equipment account for 3/4 of the market. Compared to the figures for major mainframe computers where demand is mostly for substitution of existing systems, the market for smaller computers has burgeoned: for the category of "micro/personal" computers, (in the price range from 6 to 12 million LIT) sales were more than double those of the previous year (1). Rapidly expanding have also been the activities of servicing firms "software houses", system operators, etc.), which totalled some 13 billion LIT gross takings in 1982, with a rate of increase of over 40 per cent. Here we find an extreme fragmentation of small-sized independent operators: it is estimated that at least 2 000 firms are at present active on the market, employing some 35 000 people.

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(1) See, on this point, the result of a market survey by SIRMI S.p.a., summarized on "Computerworld Italia" of 14/6/1983.

Olivetti, the major national producer of electronic products, increased its sales by 13.7 per cent and spent 160 billion LIT on R & D as against 117 in 1981. It is significant that these results have been obtained while reducing total employment by 3 700 during the year.

Manufacturing

The Fiat group has presented for the first time, in March, an example of the application of flexible manufacturing schedules to assembly operations in the engine department (fitting of engine cylinders, in particular). The cost of this new investment is said to be particularly advantageous, as the system is re-programmable and reconvertible for other engine models in the future. Until now, the application of robotized and other flexible automation technologies had been limited, in car production, essentially to welding and painting equipment. The Fiat group also announced the start of its most ambitious plan for investments in "office automation", which will cover 17 plants and 36 sales subsidiaries. After an experimental phase, in the current year some 4 000 office workers will undergo training programmes for the new office technologies and organization. About 10 000 staff will eventually be involved in significant changes in the job routine. This project is one of the largest, by international standards, in the field of global planning for office automation by a major firm.

A "second generation robot" (PRIMA, by DEA) was presented in Turin in March. Significant improvements in sensorial detection, and ability to provide for simultaneous measurements of several physical characteristics of objects were claimed.

Banking

The extension of automated services in banking in Italy has now a structured standard of regulation and there are plans for expansion. The "Bancomat" project, originally set up by CIPA (Consorzio Interbancario per l'Automazione, coordinated by the Bank of Italy) enters an operational phase with the approval by the Association of Italian Banks (Associazione Bancaria Italiana). "Bancomat" is essentially "an inter-bank convention for the development of a national system of automatic bank cash - dispensers", and involves at present 275 banks representing 80 per cent of the Italian market for banking services. Some 850 cash dispensers should be installed by the beginning of 1984 and the holders of Bancomat cards will be allowed to draw up to 300 000 LIT in any of them, independently from the location of their accounts.

From the point of view of job opportunities for cashiers, it was stressed that dangers for employment will not arise from "external"

cash-dispensers operating outside the normal opening hours, but from "internal" automatic tellers capable, with present-day technical standards, of supplying 15 banknotes per second.

Delays in the application of new automated technologies and the inability to make full use of the potential offered by the new technologies are said to be characteristic, at present, of the mode of operation of Italian banks. Such a criticism is contained in a recent report by ISRI research consultants, "Rapporto sulle banche italiane". In particular, in Italian banks there is still normally a duplication of employees in contact with the public (the "controller" and the "cashier"); this may account for a certain degree of overmanning tolerated by banks in the absence of strong competition on costs (1). The Associazione Bancaria Italiana has expressed disagreement with these opinions, giving figures on the steady rate of investment in the automation and computerization of all operations.

A new extensive survey on new technologies and work in Banks has been recently published (2). Besides the description of the leading trends in technology and indicators of growth and efficiency of banking operations, the report summarizes the results of European surveys on the possible consequences of automation on employment levels and structures, perspectives for women's employment, etc.

We conclude here with the statement of a Trade-Unionist of the sector (V. Bombari, secretary of FIDAC-CGIL) : "from yearly rates of increase of banking employment of 5 per cent until the end of the seventies, we are now at under 2 for 1982. Major banks have been limiting recently the hiring of new personnel to the replacement of natural turnover".

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(1) These opinions are reported on the special dossier on Banking, in "Mondo Economico" of 27/4/1983.

(2) "Nuove tecnologie e lavoro bancario", a cura di L. Frey e T.Tagliaferri, Quaderni di Economia del lavoro N.16, Milan 1983.

3.6 DENMARK

3.6.1 Government policies

Promotion of research and development

Numerous contributions to the debate on the future of industrial development in Denmark have been presented in this period. The Danish Association of Manufacturers of Electronics (Elektronikfabrikantforeningen, EFF) has in a report, "The Plan of Electronics 87", discussed how "the growth of the branch can be promoted, and how obstacles to growth can be eliminated" (1). The report points out five areas of action :

* reinforcement by product development, of the specific areas of strength of the firms (market contacts, technology, productivity, etc.);
* better capital investment conditions;
* satisfying the needs of industry for highly qualified data scientists and hardware/software engineers;
* awareness activities so that managers react to the threats and prospects of technical change;
* development of infrastructure of the electronics industry so that the availability of national contractors of products and services will be insured and reinforced.

In connection with this last area of action the association is discussing the possiblity of promoting indigenous semi-conductor production in Denmark.

In fact, a working party within the Nordic Council of Ministers, the so-called Nordic Data Technology Group (DATEG), has presented similar proposals, although aiming here at the Scandinavian industrial development. In a document entitled : "Information technology in Scandinavia - Heading for a Nordic data policy" (2), this working party presented an extensive list of "fields of action" including research activities in order to "observe and evaluate" the impact of data technology on : infrastructure (communication, payments and information systems), culture, labour market and production. But it also presented proposals for common public regulative activities at the Nordic level in the field i.e. a co-ordinated research, development, purchase and application of

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(1) Elektronikfabrikantforeningen, "Elektronikplan 87", Copenhagen, 1983.

(2) Nordisk Råd/Nordisk Ministerråd, "Datateknologi i Norden - På väg mot en nordisk datapolitik", NU 1982:7, Stockholm, 1982.

information technology in the public sector in the Scandinavian countries, the development of a common programme of cooperation for information and education in the field, as well as, - as previously mentioned - a proposal for investigating the feasability of manufacturing semi-conductor components at a Nordic level.

Although the DATEG-group thus supports the policy of a "broad" industrial development in the field of information technology, it reckons that : "the Nordic countries have limited propects of controlling and influencing the development... Their main margin of manoeuvre rests upon the way in which these technics are used and adapted to Nordic conditions, traditions and requirements". In yet another report, it is considered that the Scandinavian countries have developed an elaborate know-how in the application of electronic data processing (edp) technology to decentralized and democratic service systems; a know-how that entails considerable export potentials.

Promotion of R & D in the field of information technology is thus discussed in numerous reports. They differ in their presentation of the prospects of the electronic industry, but they all present the role of the State as predominant. In the case of Denmark this is a fairly new idea.

In a "programme for the promotion of investment", presented in December 1982, the government proclaimed that it intended to modernize, simplify and co-ordinate the activities of the industrial promotion schemes (1). In order to support an "aggressive industrial promotion" the government intended to provide additional funds to one of the most important schemes, the Industrial Development Fund. For 1982 these additional funds amount to 65 mill. DKr. and will reach 110 mill. DKr in 1986, on top of the budget of about 140 mill. DKr for the year 1982. Through loans and "development contracts", the Fund finances the development of products and production methods representing a certain "technological novelty".

A special R & D-Fund was set up in October 1982 under the auspices of the Ministry of Industry with a yearly budget of 50 mill. DKr and with the task of financing development projects, preliminary investigations and experiments in the field of EDP, telecommunicationand office automation. In addition the government has set up a so-called Inter-Ministerial Commitee in January 1983 in order to improve the co-ordination of public initiatives in the field of information technology.

The Council of Technology, another of the industrial promotion schemes under the auspices of the Ministry of Industry, has started up several "groups of initiative" within fourteen technological

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(1) Finansministeriet "Regeringens program til investeringsfremme", Småtryk N.30, Copenhagen, 1982.

fields of special interest to Danish industry. Here 35 mill. DKr were allocated to the specific field of information technology, and a "plan of action" was established and presented, the three highest priority areas of activity being :

* the setting up of a centre for user-design of micro-electronics;

* action in the field of the promotion of productivity and reliability of software;

* awareness activities directed towards small and medium-sized firms.

It is also mentioned in the plan that the allocated budget is considered as clearly insufficient given "the increasing importance of (information technology) for the competitivity of national industry" (1). It is also suggested that "a proper national programme for the promotion of information technology" should be realized.

In April 1982, the Government presented a statement to Parliament on the future telecommunications network. It was the Government's intention to work for the establishment of a so-called "hybrid system" i.e. a fibre optic wide-band system connecting all towns of more than 250 inhabitants, and a modernization of traditional telecommunication systems serving the remaining part of the population (about 250 000 households). The Government asked the Post and Telegraph Administration to present, before November 1983, a general plan for the technical implementation of the system, on the basis of which an implementation schedule will be decided upon (2).

Education policies

Various experiments on data technology as a discipline in Grammar School, have been carried out in Denmark since the beginning of the 70's. In an initial phase this discipline was subject to the pupil's free choice, but since 1980 experiments with data technology as a basic common course for all pupils in the first year of Grammar School, have been carried out. These courses aim to :

* give the pupils an understanding of the possibilities and limits of EDP systems;

* provide an understanding of the relationship between EDP, the individual and society;

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(1) Teknologistyrelsen, "Forslag til handlingsplan for TR's indsats på informationsteknologiområdet", Copenhagen, 1983.
(2) Fortryk af Folketingets forhandlinger (670), 10704-10711, 10, 10/5, 11/5 1983; Radikal Politik N.6, 12/5/1983.

* enable the pupils to produce programmes on the schools' own computer;

* teach the pupil to differentiate between hard- and soft-ware and give them an understanding of each of these;

* stimulate an understanding of EDP-systems in firms and institutions (1).

In total 10 out of the 142 Danish grammar schools have been running experiments with data technology as a common discipline based on these aims.

The new Minister of Education, Mr. Bertel Haarder, proposed in December 1982 to introduce data technology as a common discipline in the teaching programmes of all grammar schools.
The generalized introduction of these courses has however been postponed due to financial restrictions. For the time being, it is left to the county grammar schools to finance their courses through the local budget.

It should be mentioned that 90 % of the Danish grammar schools are equipped with some kind of EDP - mostly microprocessors.

Civil Liberties

In March 1983 the Parliament demanded the Government to present a draft Bill on: "the registers of payment systems based on account-, credit-, and payment-cards and on public control and assessment of the systems in order to ensure clarity, freedom of choice and protection against abuse from the point of view of consumers' interests". This draft Bill should be presented to the Parliament at the start of the Autumn session. The parliamentary motion was carried by a majority against the position of the Minister of Industry who previously has reckoned that statutory regulations on the introduction of new payment-systems were not imperative.

The Social Democratic Party and the Socialist Peoples' Party, who both put forward motions in Parliament supporting the need for statutory regulations on the plans for the bigger banks to introduce an on-line-payment-card-system on a national scale, the so-called DAN-card system, envisaged :

* the danger of a central registration of the individuals' consumption;

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(1) Nordisk Ministerråd, "Information om Skolan i Norden", N. 4, Copenhagen, 1982.

* the danger of building up monopolies in the field;

* the danger that only the interest of bigger supermarkets would be advanced by the system;

* and dangers of the market becoming even less easily understood by consumers.

The Minister of Justice, Mr. E. Ninn-Hansen, considered that present legislation - mainly the Act on Public Registers - provided sufficient background for regulation. The Minister further reckoned that criminal conduct, related to new information technologies like the DAN-card, could not be prevented by legislation, but rather by technical means which would make misuse impossible (1).

The tax authorities are confronted by steadily increasing problems in their efforts to prevent tax evasion, because of the extended use of computerized fiscal accounts in private firms. In fact the authorities have noticed an increase of about 60 % in tax evasions, but also a significant increase of cases from the tax authorities believes that the problem is related to the strong growth of the numbers of non-documented transactions in firms, and reckons that the extended application of microelectronic processors in future could make it almost impossible to track down cases of deliberate as well as unintentional false tax-transactions (2).

3.6.2 Trade Unions

The introduction of new technologies has been followed by a reappraisal of traditional job structures and union demarcation lines. In order for the semi-skilled workers to protect their employment a need for a vocational training reform which aims at strengthening the importance of general qualification elements like mathematics, data technology, foreign languages, etc. has become clear. This would result in semi-skilled qualifications which are less oriented towards specific jobs and firms. Semi-skilled workers should be able to continually acquire new knowledge. Such discussions within the Semi-Skilled Workers Union (SID) are along the lines of its traditional, and by other unions accepted, field of concern. The MetalWorkers Union, however, expresses its deep concern because it believes that semi-skilled workers are about to embark on vocational training programmes which would bring qualifications that are near those of skilled workers. The Metalworkers Union fears therefore that :

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(1) Information 16 March 1983; Politiken, 22 Feb., 24 Feb., 12 April 1983.
(2) Politiken, 12 June 1983.

"SID is getting involved in other unions' educational domain", and has started up a cooperation together with six other skilled worker unions with the aim of defending skilled work and skilled workers' interests. Even a new general union for skilled workers has been envisaged.

3.6.3 Employers and New Technology

The Danish Employer Confederation, DA, has started up, in close collaboration with the trade unions, a campaign for intensifying the introduction of new technologies in firms. This campaign was initiated by the so-called Collaboration Board, in which representatives from both DA and LO are present, and will be carried out on the basis of the principles agreed upon in national Technology Agreement of 1981. For DA, the campaign should involve a common effort in order to increase productivity in the firms. LO's representatives in the board consider the campaign to be most effective when it is carried out on a joint basis (1).

3.6.4 RESEARCH

A comprehensive statistical study has been carried out in Sweden on "the relationship between new technology, productivity and employment, and the possibilities of totally or partly utilizing the higher productivity of new technologies for a type of reduction of working hours". This study has been made by Dr. Leif Drambo in the Swedish Ministry of Labour.

The author finds on the basis of his analyses that the application of new technologies in production processes, products and in offices will lead to a productivity increase which is higher than the increase of production (this has actually been the case throughout the seventies, but the tendency will be reinforced in the eighties). In this development, the degree to which new technology is applied in offices in order to increase the productivity of services and administrative functions is considered of highest strategic importance.

Further, the author shows in a number of scenarios, that unemployment will lie in 1990 between 2 and 23 % of the labour force, depending on the future development of a number of strategic factors among which he points out the reduction of working hours and the existence of a national production of micro-electronic equipment as the most important. These factors will determine to which degree society can solve the potential labour market problems that micro-electronics bring about.

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(1) Arbejdsgiveren, 5/5/1983.

The author identifies other strategic factors as being important like the diffusion of new technology and exports, but condiders these factors as being more difficult to regulate.

As to the choice that will exist between economic growth and leisure time because of a higher productivity in production and administration following the application of new technology, the author concludes as an illustration of such choices that by the year 2000 the following alternatives would be possible :

* the production volume could be increased by 200 % to 300 %, or
* the weekly working time could be reduced to about 20 hours, or
* the retirement age could be reduced to about 38 years, or
* the length of annual leave could be about 29 weeks.

As to the employment effects of a reduction of weekly working hours, the author estimates that a reduction of 2.5 hours from 40 to 37.5 hours would result in an increase of employment equal to about 150 000 jobs; but because such a reduction of working hours can be expected to be followed by a more intensive diffusion of new technology, the author considers that the employment effect will be of significantly less importance (1).

3.6.5 TECHNOLOGICAL DEVELOPMENTS IN CERTAIN SECTORS

Banking and Finance Sector

An advanced automatic payment system, the so-called DAN-card system, is planned to be introduced in Denmark. Such a payment system, which will include shops, supermarkets, restaurants, hotels, petrol stations, etc., will probably connect about 5 000 terminals by 1986 for the automatic payments by transfer between the bank accounts of sellers and clients. It would thus cover 10-12 % of all payment transactions. In order to set up and run such a system, the bigger banks have agreed to set up a common company, the banks' purchase and credit card stock company (Pengeinstitutternes Købe- og Kreditkortaktionselskab, PKE). The introduction of the system, that will be technically ready at the beginning of 1984, has been met by a violent protest from consumer organizations as well as from associations of retail shopowners and supermarkets. However,

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(1) Leif Drambo, Arbetsmarknadsdepartementet, "Effekter av ny teknik på produktivitet, sysselsättning och arbetstid", Ds A 1983: 1, Stockholm, 1983.

by June 1983 the PKK had signed almost 5 000 contracts. The terminals are produced by the Danish firm ONT Automatic A/S and the central computer system by Chr. Rovsing.

A central registration and treatment of transactions and securities was started in March 1983. This project has been worked on since the late sixties, but only achieved its present status after a ministerial report on "The Bond- and Stock-free Society" (1) and after the final passing of a law "The Central for Securities" in 1980. The Centre is a private independent institution, which, once fully developed, will register all information and transactions related to bonds and stocks through an on-line connection with banks, stockbrokers' offices, building societies, etc. As a first step, bonds to a value of 620 bill. DKr were registered by this central registration office in March 1983. It will be up to the Minister of Industry to decide when stocks should be included. An agreement between banks and employees organizations has been reached, which leaves all clients' contacts to be dealt with by the traditional agencies. The agreement lays down the need for vocational training of all personnel working with the system. 350 employees are expected to receive such training on the legal and practical aspects of the functioning of the first phase of its introduction (2).

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(1) Obligationsudvalget, "Det obligations- of aktieløse samfund - Edb-indskrivning istedet for papirer", Betænkning N.793, 1977.
(2) Samvirke, Nov. 1982; Politiken, 29/3, 6/4, 1983.

3.7 THE NETHERLANDS

3.7.1 Government activities

The special body created for the coordination of government policy in information matters (Beleidsgroep Informatie) was unable to establish the necessary uniformity of approach by Ministries and other government agencies. The structure of decision-taking has therefore been fundamentally changed; in future the responsibility for the coordination and consistency of official policies in the field of information and the like will be assumed by a ministerial committe chaired by the President of the Ministerial Council. In this commission, involving the Ministers of the departments most concerned (Economic Affairs, Education and Science, Home Affairs, Social Affairs and Employment), the main decisions are taken or considered for approval. The structure of decision taking in the field of information has been centralized, although with sufficient capacity for creative initiative.

Promotion of Research and Development

The Dutch Government promotes Research and Development in the field of information technology mainly in four ways :

1. The establishment and sponsoring of Microelectronics centres connected to the main technical universities.
2. Subsidies to industry for Research and Development.
3. Experiments and development of infrastructure.
4. Financing technological research.

Microelectronics (ME) centres

Recently three ME-centres were created, attached to the Technical Universities of Delft, Eindhoven and Twente. They are supposed to give advice and technical support to small and medium-sized enterprises and work on a competitive cost basis, in order not to disturb normal and fair competition.

The Delft-centre promotes the access of industry to know-how available in the Technical University and in the Netherlands Organisation for applied scientific research (TNO). It will also specialize in a sensor-programme. The Eindhoven-centre will provide information on the technical, financial, organizational and marketing aspects of ME.

In addition it will start an on-the-job training programme. The Twente centre's task lies in the improvement of knowledge on the wide applications possibilities of ME, in particular for industries located outside the urbanised western areas of the country. Twente will concentrate on biomedical sensors, improvement of software and educational applications.

The three centres are coordinated by a central board.

Industrial Policy

Credits and subsidies aimed at removing financial barriers to the use of ME in production and administrations are the following :

Promotion

A subsidy to help finance advice on the introduction of ME; 40 % up to Hfl 10 000. The subsidy is only given once to a company or firm; only firms with less that 500 employees are entitled.

Technical development credit (of which the ME-credit is a special form) for innovating firms. The credit (5 % interest p.a.) may amount to 70 % of investment in a project of a small- or medium-sized firm. Large companies get only 40 % credit.

Innovation management courses on the introduction of ME products can be subsidised to the tune of 40 % of costs up to Hfl 5 000 per company or firm, as well as funding for accessing external advice.

A subsidy for information projects for common projects of 5 or more small- or medium-sized firms or companies, leading to real improvement in information and administration by means of computers. The subsidy is 40 % of costs up to Hfl 250 000 per case.

A development facility (ACSI) for the computer service industry, with a 1983 budget of Hfl 20 million for management training, productivity increasing methods, research and the creation of a software centre. Applications for funding are to be directed to the Dutch Investment Bank NEHEM.

Education policies

This concerns three important topics : methods of teaching informatics, education with new technology and vocational training in schools, and on-the-job training of young people in new technology.

The teaching debate

Last year two official commissions have reported on education for the civil use of informatics. The two commissions are known by the names of their chairmen, Professor Uhlenbeck and Professor Plomp. The importance of their recently published advice is underlined by the large number of reactions they have elicited.

a) The Uhlenbeck-commission is looking at Computers in Education (Computers in het onderwijs) and uses a notion of "civil use of education" as being more or less equal to the "minimal amount of information technology that can, with some success, be presented in schools". This explains their recommendation to start with education of IT from the age of 14 years, the earliest age in their opinion when a sufficient capacity of abstract thinking allows a fruitful application of IT education (which is looked upon preponderantly from a viewpoint of mathematics).

b) The Plomp-commission on Education and Information Technology on the contrary, looks upon IT as some kind of "machinology" and stresses somewhat less the link with mathematics and abstract thinking. It believes that working with technology that should be understood, and this seems also possible for younger children and people with fewer abilities for abstract thinking.

Experts on the subject expressed their surprise that two official commissions, nominated by the very same Ministry of Education and Sciences, should give such diverging recommendations on the same matter. It therefore seems likely that both recommendations will be accepted, allowing for a very general information education of young and old on a less abstract level, combined with specialized education in the more mathematical side of it, for people that by age and ability are able to digest the more abstract implications of IT. Meanwhile a third working party (the Werkgroep informatica - onderwijs), has studied and given advice on how to teach IT. The latter working party, involving experts from industry and science, stated that education and training of automation experts is progressing satisfactorily, but that more attention should be paid to non-specialized education and training. School children as well as adults should be freed from unjustified fears and should learn an unbiased, cool approach to handle the new devices. The working party recommends to open facilities for everybody to learn the necessary skills, particularly experiments with man-machine relationship and with situations in which new devices can or cannot be used, development of IT think and use models, training for work in algorithms and modular problem solving.

Information technology in schools

Specific plans on IT and education have been laid down in a Memorandum on Education and Information Technology. This memorandum assumes that the position of modern information technology in the field of education needs more attention, and concentrates on necessary changes in education services, programmes and techniques. The memorandum deals with the various parts of the education system, starting with basic level schools, where experimental IT projects will begin in 1984. In high schools and colleges (medium level education) the first IT programme will begin in 1984/1985 in 100 schools, and include specialist training of teachers, while in vocational training the stress is on modernising programmes and their impact at lower, middle and highest levels, and the problems of cooperation within the system.

60 million guilders will be spent in the 1984/1989 period on these programmes. By mid 1983 about 800 microcomputers has been ordered for these experiments for which a budget of Dfl 2 million is available, jointly founded by the Education and Economic Affairs Ministries. Suppliers are Philips and MCP.

Practical training for innovation activities

Within the Employment Plan of the Ministry of Social Affairs and Employment, a budget of 135 million guilders is made available for stimulating the provision of training of young people by employers, of which about 5 million are especially devoted to training in innovation activities, i.e. computer aided activities.

Developments regarding Labour Law

Recently a new Law on Labour Conditions was adopted instituting a more dynamic system of control and labour conditions, essential in view of the speed of technological change.

All regulations concerning Safety and Health of employees within the previous Safety Act 1934 will continue to be applied and will be integrated in the new system, which gives and asks more responsibility to and from employers and employees. One of the basic principles is that new technology must be applied to secure optimum safety and health, a principle which will be enforced at a later stage by detailed regulations. Important new rules on safety and health concern the employer's obligation to inform employees on job-content possible dangers and preventive measures, to instruct employees on matters of safety, health and well being, to draw up an annual policy plan on labour conditions and to publish an annual report.

Employees will be obliged to monitor their own working conditions (especially regarding safety and health), and will be entitled to stop work in situations of acute danger.

The Labour-Inspectorate will be able to give binding instructions for the improvement of an unsatisfactory situation.

The new legislation views the quality of working life and humanisation of work as closely linked to safety and health matters. The dual obligation on employers and employees to create the best conditions and be vigilant regarding working conditions, is an important part of the Act, particularly since ME technology is somewhat of an unknown quantity in terms of its impact on working conditions, making it difficult to regulate closely. Works Councils have an important role here as they get new powers to demand information on working conditions, in particular from officials of the Labour Inspectorate and from the Head of the company's health service. Works Council members will also be entitled to accompany officials of the Labour Inspectorate on their visiting tours on the premises of the company and to interview officials without third parties being present. These new powers of the Works Councils may prove to be fundamental for the control of the conditions of working life with new ME technology. However, this part of legislation will be implemented in a later stage.

Major projects

There are two major IT projects in which the Dutch government plays an important role: the National Clearing System and Cable Networks.

Two important financial clearing systems operate in the Netherlands, private banks and GIRO. Both systems are highly automated, but the same is not true for the clearing between the systems.
The remittance of money from bank-account to giro-account or vice versa takes from 3 days to a week or more, whereas remittance within systems are usually completed from one day to the next.

In 1975, a special commission started to discuss the possibilities of integrating both systems. This commission (Stuurgroep Integratie Giroverkeer) recently published its second report pointing to the difficulties (technical and otherwise) of integration. But if a solution is found, the consequences might be of far-reaching importance for society, especially for employment, particularly as concerns a wide use of scanning, payment by credit cards, automated handling of cash, on-line bookkeeping, stock administration and ordering and other labour saving techniques.

The total loss of jobs in the banking system is assessed by Trade Union experts to be much larger than the report estimates - about 3 500 out of a total number of 114 000 employees.

Experimental cable networks are being installed in the provincial town of Zaltbommel and are being planned for a densely populated area in the south of the country (South-Limburg). The facilities in Zaltbommel are more advanced than in the rest of the country (local broadcasting, televideo), but are still on a one-way base. From 1984 onwards the two-way system will gradually be implemented in approximately 3 000 subscribed homes.

3.7.2 SOCIAL GROUPS - COLLECTIVE BARGAINING

As early as March 1981, the Minister of Social Affairs formally asked for advice on ME developments from the tripartite Labour Market Council, which submitted its report in October 1982. The report expects 95 000 fewer full-time jobs by 1990, 1,8 % of the working population. For the quality of working life, the report expects an overall improvement, in particular because of the disappearance of heavy, unhealthy and unpleasent work, though it recognizes the probability of certain negative effects.

In commenting on the report, both sides of industry agree that it would be impossible to counter the use of new technologies and that barriers to their introduction should be removed. Their position deviate regarding the extent of negative impact and necessary measures to protect the worker's position.

Trade Union reactions

The Union position preponderantly is one of concern. The Union delegations in the Labour Market Council are of opinion that the expected job loss by the chip forms an additional argument for a comprehensive employment policy, including planning of employment, investment, training and education, and integrating industrial policy.

Employees should have more say on innovation and investment, with short- and medium-term plans being drawn-up jointly by employers and employees. These plans should also include solutions to quality of working life problems and methods of distributing work, as well as controlling the speed at which ME technology is introduced in production. This whole consultation and planning system should, according to Unions, be subject of technology agreements.

As for the way quality of working life is interpreted in the Labour Market Council's Report, Unions deplore it being confined to the dimension of physical job conditions and job content, thus ignoring the complete interaction of all stress-causing factors. They also criticise the Report's not covering organisational matters, pay and fringe benefits, and the mismatch between job content and available skills. Unions also fear negative developments regarding issues such as the powerful positions of small groups of experts in information systems, the standardization of work, excessive control of work and workers.

They finally conclude that the advantages of new technology for the workforce do not outweigh the disadvantages and stress that the responsibility for reducing these negative effects lies with the employers. They demand the help of government authority to improve the quality of working life, for instance, by enforcing the Act on Labour Conditions and by a wide use of subsidies for job improvement.

Employers' reactions

For the employers ME technology is a challenge for the country, opening new possibilities for the strengthening of competitive performance by Dutch producers. They do not agree that the Report's should be reason for a special microelectronics-oriented employment policy or for an all-embracing planning system as asked by the Unions. On the contrary, they fear from such a planning only barriers to necessary innovation. Also with respect to the effects on the quality of working life the employers do not see any significant difference from other technical developments in the present and the past, and for that matter no reason for special ME-oriented policies. In their opinion one should not exaggerate the negative effects on the working life, in view of the generally positive reactions on the enquiry done for the report.

Employers also stress the existence of a number of social barriers to a speedy use of new technology in production : insufficient skills and expertise, psychological barriers towards changes and necessary training. Given the need for a speedy introduction of new techniques an active policy is claimed necessary to remove existing barriers. Employers are most reserved with respect to interference by national or European legislation in matters of disclosure of company information and consultation of employees as to investment plans and jobs' future. They deem the existing national regulations sufficient and disapprove of compulsory talks on other than company level.

3.7.3 RESEARCH AND STUDIES

The introduction of new technology is a subject of extensive examination, both technical research and development, and social end economic research.

Technical Research and Development

A report on information technology R & D was completed in May 1982 by the engineering consultants bureau Burnaby Lautier (1) and suggested that the informatisation of society is not exclusively promoted by telecommunications and computers scientists, but largely by the fields of application. If there is little interest in the fields where IT can be applied then the speed of diffusion and application can only be slow.

The interest of the public is reflected in the direction of research activity; technical research is on software production or computer services, followed by industrial hardware, medical applications, applications for education and science, manufacturing, for engineering, libraries and documentation and telecommunications. So far only little attention has been paid to TV and related services, audio-visual equipment, publishing and printing, commercial business, and almost nothing on public services and culture.

In quantitative terms about 3/4 of research projects concern almost purely data processing. In almost one quarter of these cases it concerns the use of computers for instruction. In only a minority of cases the research concerns communication of general information as for instance viewdata and teletext.

Dutch R & D into information technologies could be characterized as well directed in international terms although rather poor in terms of long-term research. Cooperation between researchers and with potential users is not good, except for cooperation between researchers and financial sponsors. However, research finance from private business is poor compared to Government finance. Finally work on research topics tends to be disproportionate, with a particular emphasis on communication and fundamental techniques.

Research on the implications for society

The first report in this field was the Rathenau-report in 1979 "The Consequences of Microelectronics for Society". This important study was for many an eye-opener on far-reaching

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(1) Burnaby Lautier Adviesgroep stimuleringsmaatregelen, Inventarisatie, Informatietechnologisch Onderzoek, Leusden, 1982 (unpublished).

implications of microelectronics, and thus of new information technologies for social and economic life. The Rathenau-report, commissioned by the Minister for Science Policy, was followed-up by a number of other studies, all under the auspices of the Minister of Social Affairs and Employment. Firstly came a literature search on the possible effects on employment in different branches of industry and then another of a more speculative nature on macro-social implications.

Another study in this series was completed in 1982 dealing with the impact of ME in job content, labour relations on the shop floor, responsibilities, stress, privacy at work, etc., and drew heavily on available knowledge and influential opinion on these subjects in Europe, North America and Japan.

A further piece of research went into the implications for employment and the quality of working life for women and consisted largely of interviews of the women concerned, and further work will be done on how to improve the situation.

In universities and research institutes a great deal of work is done also on social aspects of new technology.

Research tends to be divided, however, between purely employment oriented goals and those of working conditions. All different aspects of the quality of working life are present in social research : job content, stress, labour relations, pay and fringe benefits, autonomy, codetermination - they are rarely linked together. As the quality of labour is often influenced by the management style, this latter component is often considered, mostly in the projects on office automation, whereas ergonomic aspects are often subjects of research in the field of automating manufacturing processes. This could cause confusion in some studies which conclude that the quality of working life improves (in an ergonomic sense) or detoriates (in a social sense), depending on which aspect gets the most weight in the study.

To counter charges that researchers rarely take decison-making into consideration when examining effects, more projects have recently concentrated on decision and choice that are open.

Conferences

In October 1981 the Netherlands Study Centre for Technology Trends organised a symposium on the subject "Microelectronics in Profession and Business". An interesting series of reports was edited (in Dutch), in which the social side of technology trend got

due attention. The Centre continues to produce papers and have conferences on this and related subjects, as for instance automated manufacturing and office automation.

A second important conference to be mentioned took place in December 1982, when the Dutch Association of Sociologists and Anthropologists (NSAV) had their annual meeting on the subject : Transformation by information ?. The social consequences and the determinants of technological development. A comprehensive picture was given of the state of the art in the fields of economic and social implications of new information technology and of the determinants of innovation, theoretically and practically, from macro, micro, management and social policy point of view.

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3.8 BELGIUM

3.8.1 THE ROLE OF CENTRAL GOVERNMENT

Promotion of Research and Development

Government support for pure and applied research into new technologies is channelled through funding from an array of public agencies set up to foster scientific and technical research. They are the Institut pour l'Encouragement de la Recherche Scientifique dans l'Industrie et l'Agriculture (IRSIA - Institute for the encouragement of scientific research in industry and agriculture), the Service de Programmation de la Politique Scientifique (SPPS - Scientific Policy planning service), the Fonds National de la Recherche Scientifique (FNRS - National scientific research fund) and the Fonds des Prototypes (Prototype fund). The research grants are normally awarded to universities, but funds are also made available to companies and other research centres working closely together with university research laboratories.

GOVERNMENT FUNDING FOR RESEARCH AND DEVELOPMENT IN MICROELECTRONICS ACCORDING TO FIELD OF RESEARCH
(BF MILLIONS)

	Micro-electronic Technology		Telecomm-unications		Automation EDP		Instruments Equipment		Total		Annual R&D Appropriations
	Tot.	%	Tot.	%	Tot.	%	Tot.	%	Tot.	%(1)	
1975	39.1	13.3	56.1	19.1	152.2	51.0	46.3	15.8	293.7	3.0	9,692.0
1976	90.1	22.1	101.9	25	159.8	39.3	55.1	12.5	406.9	3.7	10,967.0
1977	34.2	14.2	138.0	57.3	34.3	14.2	34.3	14.2	210.8	2.2	11,053.0
1978	81.2	19.4	114.5	27.3	89.5	21.3	134.1	32	419.3	3.9	10,676.0
1979	128.2	30.6	116.3	27.8	90.4	21.6	83.8	20	418.7	3.7	11,415.0
1980	76.3	11.2	266.8	39.1	143.6	21	196.2	28.7	682.9	5.9	11,637.0

(1) compared to total public budget appropriations for research and development in Belgium.

does not include : - R & D funded from operating budgets of universities,
- funding of international scientific cooperation.

Source: National scientific policy council: The social impacts of the microelectronics research policy, Brussels, 1983, p.38.

The foregoing table clearly shows that financing of R & D overall was simply marking time between 1976 and 1979. It was not until 1980 that a more intensive effort was made, focussing on microelectronics. In fact, the total R & D budget contracted in real

terms between 1975 (when it accounted for 1.33 % of public spending and 0.42 % of GNP) and 1980 (by which it represented only 0.92 % of public spending and 0.34 % of GNP). This clearly demonstrates the importance the government attaches to microelectronics. While business provides 90 % of the cash and manpower invested in R & D into advanced technology, universities and research centres contribute only 10 %. The man-hours currently spent on R & D work of this nature in Belgium are equivalent to 3 500 FTE (full-time employees) - 3 100 in commerce and industry; 400 in universities and research centres.

The I.R.S.I.A. has persuaded 13 companies to take an active interest in a large-scale robotics project, known as the PECARI project (Programmation et commande adaptive d'un robot industriel - flexible programming and control of an industrial robot). The project is built around three key elements :

* developing control software on mini- and microcomputers,
* perfecting an image system,
* developing energy sensors, mathematical models for the robots and control systems, etc.

Eight university research laboratories are involved in the project. BF 72 million has been budgeted for the basic programme and a further BF 75 million for allied projects. The two-year programme got under way in September 1982. In October 1982, the Minister for Scientific Policy published his Ministry's policy statement on the future directions of R & D in microelectronics. Entitled "Programme of action in the field of microelectronics-based technologies", it provided a clear statement of the underlying considerations and principles on which future Belgian industrial and R & D policy are to be based. It also announced a study on the economic and social impact of microchip technology.

Health and Safety at Work

Whilst the Ministry of Labour and Employment has overall responsibility for occupational hygiene, safety and medicine, it has so far signally failed to mount any kind of study into how occupational health and safety might be affected by the introduction of new technologies. The occupational health and medicine authority, however, was closely involved in drawing up opinion No. 250 presented by the Council supérieur de sécurité, d'hygiène et d'embellissement des lieux de travail (Council for safety, hygiene and an improved working environment) concerning physical and mental occupational stress. The opinion incorporated comments on the new constraints that working at VDU-terminals may exert on working conditions.

Education

A committee formed of Ministry of Education officials, school inspectors and representatives of psycho-medico-social centres has been set up to examine the problems of introducing new information technologies into education. It has put forward a number of recommendations, including one to equip the educational system with different capacity computers appropriate to the levels at which they are used. The network should be centred around a large national mainframe; the regions would act as relays with minicomputers located at strategic anchor points; while local centres (individual schools and colleges or groups of educational establishments) should be fitted out with micros.

Central government initiatives and progress on computer-aided learning are only a part of what has been achieved in independent schools and colleges falling within the official education system. In these, computer equipment is often acquired through friendly societies and non-profit organizations and made available to pupils and students by teachers and lecturers who have followed IT courses in their own time and off their own bat.

3.8.2 ACTION BY REGIONAL AND COMMUNITY GOVERNMENTS

The Flemish Government's Third Industrial Revolution

The Laws of August 1980 devolved decision-making powers in the economic policy sphere to the regions. Since then, the Flemish regional government has put into action a policy to revitalize and reorganize the region's industrial base. The policy is called the 'Derde Industriële Revolutie in Vlaanderen' (D.I.R.V. - the third industrial revolution in Flanders), and aims to promote the development, application and transfer of the new technologies in Flanders.

The policy is being implemented in a number of different ways :

* by organizing discussion and information exchange days (called T-Days) for representatives from universities, scientific agencies, local and regional authorities and the industrial and business communities,

* through an international exhibition centred on the new technologies, held in Ghent in May 1983 and called "Flanders' Technology".

The Flemish government aims to play a decisive role not only in the industrial and economic reorganization of the Flemish region, but also in mobilizing a more wide-ranging public discussion on the social impact of microchip technology.

Operation Athena in Wallonia

Wallonia's response to the challenge of new technologies takes form of operation ATHENA, run under the auspices of the Walloon Ministry for New Technologies and Smaller Businesses. The operation is an umbrella concept for four distinct but related actions :

* ATHENA days; which take the form of briefing sessions to explain new technologies to business leaders,
* the ATHENA club; which is a forum for the leading technological innovators of the region (researchers, businessmen and administrators),
* a technological innovation prize for researchers and the "Chouettes d'or" awards for business innovators,
* the 'Responsable de l'Innovation Technologique' programme (Technological innovation officer), to defray the cost of placing an engineer with a smaller business applying for help in deversifying its activities through the introduction of new technology. This programme is run jointly with the EEC.

3.8.3 THE OUTLOOK FOR EMPLOYMENT

The only data currently available as to the probable employment impact of electronic-based technologies are those contained in two projections.

The first, constructed by Valenduc and Laffineur, concludes that the spread of new technologies will have lead to the loss of 58 000 jobs between 1979 and 1985 (1).

The second, produced by the Planning Office, consists of econometric simulations (SERENA) positing three alternative scenarios :

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(1) G. Valenduc & J. Laffineur : "Face aux nouvelles technologies, Fondation Travail-Université, Brussels, 1982, Report No.7.

SIM I: spreading and cumulative use of microelectronics in three sectors of the economy: manufacturing industry, distributive trades and other retail services;

DDT 1: a reduction in working time I: the future diffusion of microelectronic technology produces an increase in the rate of reduction of working time to 1.5 % a year (from 1 % in the reference scenario) in industry and the distributive trades, and 2 % in other retail services.

DDT 2: workers forgo part of their real wage rise in exchange for fewer working hours.

These estimates reveal a potentially deep-reaching effect on patterns of employment. If no further steps are taken to further reduce the working week, then 33 750 jobs will be lost in the space of four years, and a total of 133 617 by 1990. If productivity increases at twice the projected rate in SIM I (8 % rather than 4 % in industry and distribution, and 12 % instead of 6 % in other retail services) then 27 356 jobs would be lost in industry, 16 940 in distribution and 44 634 in retailing by 1985. That would be a total of 88 930 jobs lost altogether, or 55 180 more than projected by SIM I.

3.8.4 ECONOMIC AND SOCIAL IMPACT OF NIT

The Conseil National de la Politique Scientifique (National Scientific Policy Council) published its first report in this field in 1983, entitled "The social impact of microelectronics research policy". In fact, however, this first report deals with research and development aspects only. The economic, social and educational consequences of the policy will be considered in a later report.
Among the recommendations made by the CNPS are that government should increase the public funds released for research and development, stimulate more interest in basic and applied microelectronics research, and ensure that a basic balance is maintained between technological and social research. The CNPS urges that 10 % of research budgets should be devoted to social research. It also feels the government should do more to help the transfer of knowledge and techniques to smaller business.

Another guide to official government thinking in this area, however, can be drawn from the document published by the Ministry of the Budget, Scientific Policy and Planning, entitled "Programme of actions in the field of microelectronics-based technologies" (October 1982).

In the Ministry's view "it is an inescapable conclusion that: ...the economy of this country must be adapted with all possible speed to the "microelectronic revolution", not only for over-riding considerations of our future competitiveness, but also if we are to maintain present levels of employment in the medium- and long-term". (p.01).

The opinion is expressed that business must take advantage of the new productivity-enhancing technologies to sharpen their competitive edge. But the effectiveness of technological innovations depends on how well we are able to control technical progress and its social impact. The study and control of social conditions and consequences are subservient to the aim of improving economic and technological efficiency. It is also important that the benefits of increased productivity be fairly shared out over the entire spectrum of business activities : reduced selling prices, increasing net cash flow, increase in real incomes, paying for the Social Security System and financing public spending. "...The latter two of these areas to which productivity gains might be applied, namely increased wages and financing the Social Security System and public spending, also raise the question of the dicision of work and the distribution of wealth. These are crucial if the new technologies are to be welcomed by society. The problem facing employers will be how to devide the working time available between a greater number of workers without increasing costs or reducing efficiency. But this kind of change, while admittedly vital, has its limits. You cannot keep on reducing the amount of work an individual does indefinitely" (p.60).

3.8.5 INTRODUCING NEW TECHNOLOGIES INTO INDUSTRY

The current state of play

There are at present (i.e. July 1983) no laws on the statute book or specific collective agreements governing the introduction of new technology. The current negotiations in the Conseil Central de l'Economie (Central economic council) and Conseil National du Travail (National labour board) aims to remedy that fact (1). Nevertheless, a number of Royal Decrees and specific provisions of various collective agreements do give Works Councils and Health, Safety and Workplace Improvement Committees the right to information on company plans and proposals (articles 11 and 12 of the Royal Decree of 27/11/1973) and the right to be informed beforehand about the effects future decisions will have on employment (articles 3, 4, 5 and 8 of C.C.T. No. 9).

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(1) Subsequent events will be reported in a next issue.

A certain number of company agreements on technology have been signed, however, as well as an industry agreement for the press and publishing signed on 6 February 1980 and dealing with the introduction of new photocomposition equipment.

Among the company agreements are :

* the Agence BELGA agreement; new information technology was accepted in exchange for guarantees that existing jobs of permanent staff would be preserved, and that existing employees, including those incapable of using visual display terminals, would not be downgraded,

* the F.N. (Fabrique Nationale, Herstal) agreement, dealing with the introduction of computer-aided design techniques,

* the Caisse de Compensation pour Allocations Familiales (Family allowances equalization fund) agreement; here, the various joint bodies (Works Council, Health, Safety and Workplace Improvement Committee) have secured the right to an active say in matters concerning new technologies. The trade union will in future be able to call in outside specialists before any new system is installed.

Trade union demands on introducing new technology

The Fédération Générale des Travailleurs de Belgique (Belgian General Federation of Labour) set out its position in a memorandum of 4 March 1983, entitled "Basic options for the FGTB on the controlled introduction of new technology". The union aims, through agreements with employers and using the rights quaranteed by under the law, to secure guarantees that where new technology is introduced, existing jobs will be protected, new jobs will be created, working time will be reduced and the quality of working life improved. The FGTB wants works councils to be informed well in advance of any decision to appraise a project or for specific investment in new technology. Workers' representatives must be given sufficient time to put forward a viable alternative if they wish. The workforce should be given the following information : the company's proposed strategy for introducing new technology, the basic options open, technical and economic data, the objectives, means and methods used in assessing the production volume, product innovations and changes to manufacturing systems.

The socialist trade union wants union branches to have a preliminary control on all proposals for State funding for industrial R & D in the private sector; in line with the C.N.P.S. recommendation, it is also demanding that 10 % of the funds allocated to

research into technology be devoted to the social aspects of new information technologies.

The Confédération des Syndicats Chrétiens (Confederation of Christian Trades Unions) made its position clear at its extraordinary congress held in Liege on 12 March 1983. The C.S.C. came out in favour of an outline agreement setting out the principles and procedures to be followed before any attempt was made to introduce new technologies. The three key elements of such an agreement would be :

* duty to inform : clear, understandable language, adequate notice,

* right of opinion : sufficient advance warning must be given to enable workers to be consulted; workers must be able to call in a union expert,

* negotiation : over all matters related to services or working conditions; account to be taken of security and amount of work, adequate occupational training, performance appraisal, etc.

No similar policy document has yet been issued by the employers' organization. The various industry federation (FEB, FABRIMETAL, etc.) say they are not authorized to make policy statements on this subject and refer all queries back to their members. However, the discussions which have already taken place at meetings of the Interdisciplinary Group give rise to the distinct impression that the employers will be opposed to a number of the union demands set out above. The report of the Study Group on Chemicals and Pharmaceuticals puts on record their employers' view that : "...Companies have a clearly-defined legal duty to provide adequate training for their workers, and workers' representatives on existing joint bodies. The success of any change is to be measured by the extent to which those affected understand the significance of it and the adjustments necessarily resulting from it. But it must be stressed that the sole responsibility for the choice, phasing-in and timing for the introduction of technologies, lies with management. THERE CAN BE NO QUESTION OF SLOWING THE DECISION-TAKING PROCESS DOWN BY A REFUSAL TO COMPROMISE OR INTRODUCING FRESH RESTRICTIONS (capitals in the text) (CNPS, Report of Study Group No. 4 on Chemicals and Pharmaceuticals, p.14). A little further on, referring to social research, the report states : "...As far as social research is concerned, the employers' representatives do not consider it justified either for the individual chemicals company, and certainly not in the form advocated by certain of its proponents".

Social impact of new technologies

The FGTB set out its official policy on the social aspects of advanced methods of working at a press conference in Brussels on 7 October 1982. It was contained in a document entitled "Social aspects of technological progress".

The FGTB takes the view that, like nuclear energy, electronic technology is being foisted on society by capitalists and technocrats without regard to the needs of the population generally, and even to market demand, and without prior study of the problem it is creating.

One particular characteristic of non-traditional technology is that it flouts the previously observed relationship between innovation and employment. The FGTB sees NIT as having only a negative impact on employment. It foresees massive employment losses in public administration as the interactive office becomes more widespread, and predicts large-scale job shedding in industry with increased use of robot systems and computer-aided design and manufacturing techniques.

The FGTB fears that NIT will widen the existing social gaps between skilled and unskilled workers. Production systems will be reorganized, and new social and organizational relations will evolve both within and outside the company. Women will be more seriously affected by microelectronic than men.

The FGTB concludes that : .."Trade unions welcome the new information technology, provided it contributes to the redistribution of work and the development of more fulfilling and humanized work".

Within the C.S.C., the L.B.C. (Landelijke Bedienden Centrale: the national union of Flemish-speaking workers) published the proceedings of its 1981 conference on technological development. In August 1982, the research department of the Centrale Nationale des Employés (expression française) (national union of French-speaking workers) published a special issue of its review "Studies and Documentation" entitled "New Technologies: What must be done now".

The C.S.C. believes that the class structure of workers will be profoundly affected by the combined effects on new technologies and the continuing recession. It fears that the likely outcome of these developments - the deskilling-overskilling process,

radical reorganization of working time, lack of job security - will be the growth of TWO NATIONS comprising two different classes of worker : a highly-qualified, well-paid minority with secure jobs; and a low-skilled entirely replaceable majority with no job security. The national economy will also be split in two : an official economy, and a parallel 'black' economy based on "lump" labour. The C.S.C. predicts that unemployment will continue to rise because investments in new technologies are aimed at enhancing productivity rather than developing new products or expanding volume production.

3.8.6 THE AUTOMATION OF THE ECONOMY

INDUSTRY : The robotics revolution

The pace at which robots have been taking over manufacturing tasks in Belgian industry has been increasing regularly since 1981 according to estimates put out by the Institut belge de régularisation et d'automatique (I.B.R.A. - Belgian institute for control and automation). The Institute bases its claim on the findings of its annual survey amongst manufacturers and users of robots, shown in the following table :

ANNUAL SALES OF ROBOTS IN BELGIUM AND ESTIMATED TOTAL ROBOTS IN USE 1977 TO 1982

	1977	1978	1979	1980	1981	1982
Sales	7	9	9	28	188	104
TOTAL IN USE	12	21	30	58	246	350

Sources : I.B.R.A., quoted in : Technique et Management, Sept. 1982.

Estimates based on known current investments in robotization put the total number of operational robots at 700 by the end of 1983. The pace at which flexible automation is developing in Belgian industry ranks Belgium 4th in the world on the ratio of robots to the working population.

Near to 90 % of Belgium's robots are used in the metal manufacturing industry, with 80 % of all robot systems operating on the production lines in motor vehicle plants. Car-makers' plans for the future of the manufacturing sequence will bring radical changes to the face of the industry in the not-too-distant future.

The automatic factory is also well on the way to becoming a reality in other industries such as chemicals and pharmaceuticals. The report of the Study Group on Chemicals and Pharmaceuticals to the Council for Scientific Policy on research into the socio-economic impact of microelectronics stated that : "...The impact of microelectronic technology on the chemical industry will differ widely on the different types of activity. The production process is already heavily automated, and it is unlikely that microelectronic technology will have any further significant impact".

The major impact on this sector of industry will come with the automation of office work. Job statistics for industry show continuing shrinkage in the labour force between 1976 and 1980, while office jobs remained stable, and the number of managers rose slightly.

Banking

Banks were the true pioneers of automated systems in Belgium and remain at the forefront of automation strategy. A wide array of banking transactions are now done through computer networks in the C.E.C. (Centre d'échange d'opérations à compenser du système financier belge - centre for clearing operations for the Belgian financial system) - a sort of electronic bank clearing house. The C.E.C. performs three of the 'standard' banking operations : automatic crediting and debiting of accounts, and standing orders. In 1982, 80 % of all bank clearings were done by computer, and only 20 % manually. Belgium must surely be the only country in the world to possess a clearing house which is essentially a vast electronic network linking together all the country's financial institutions.
Between the end of 1979 and the end of 1981 the numbers of automatic tellers available rose from 258 to 439 and point-of-sale terminals increased from 36 to 272.

It is difficult to assess the true impact of emerging technologies on employment in the banking sector, however. What is certain is that microelectronic technology has increased the number of services available without creating fresh jobs. Between 1975 and 1981, employment in the banking sector rose by 3.9 % from 45 480 to 47 260 (although from 1980 to 1981 thetotal workforce contracted by 500 jobs) while the volume of savings accounts expanded by 34.9%, and current account business grew by 44.3 %.

Telecommunications

The Belgian telecommunications industry has an annual turnover of BF 25 billion, and invests near 15 % of it in R & D. 50 % of its turnover is export business. Development of the domestic market

is determined largely by the policies of the telecommunications authority, the R.T.T. (Régie des Télégraphes et Téléphones), and the broadcasting authorities (RTBF-BRT), together with those of certain other public services. Telecommunications and radio and television are both State monopolies.
Cutbacks in public spending has menat fewer orders for the telecommunications industry. It has also slowed down the modernization of the national telecommunications network, which has applied an effective tourniquet to the marketing of new technologies.

The Secretary of State for posts and telecommunications recently inaugurated the Belgian public packet switching network, D.C.S. (Data Communications Servie). This could give a welcome boost to the market for terminals.

The R.T.T. currently employs some 30 000 people, and is expecting that a further 5 to 8 000 new jobs will be created by 1990. More technical employees and manual workers will be required to cope with the projected increase in subscribers. Office automation, however, will probably lead to job losses among administrative employees.

Government

After industry and banking, the third largest customer for computer systems and software in Belgium is the State itself. By the end of 1979 over 250 computers were already in daily use in Ministries and publicly-owned establishments. As long ago as 1968, the government brought in legislation to assure a degree of coordination between administrative agencies and to put an end to I.B.M.'s virtual stanglehold on the administrative data-processing market. The government concluded so-called "progress contracts" with a number of firms, leading to the creation of new jobs and helping establish, if not a Belgian, then at least a European, information technology industry.

Data-processing companies

Despite major government contracts and an array of programmes to finance scientific research, Belgium has so far seemed unable to establish a national computer industry capable either of competing on the international markets, or even satisfying domestic demand.

Using data published by the financial magazine Trends, G. Valenduc and J. Laffineur (*) constructed a table of the 15 leading computer and office machinery companies operating in Belgium in 1980, ranked by sales volume : 9 were American, 5 European and one only was Belgian - C.E.G., a software company, showing a BF 814 million turnover in 1980.

The Belgian computer manufacturing industry consists almost entirely of assembly plants building mainframes from imported components. Its projected turnover for 1983 was $ 88 million.

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(*) G. Valenduc, J. Laffineur : Facing up to new technologies, Fondation Travail-Université, Brussels, 1982, Report No.7.

3.9. IRELAND

3.9.1 New Technologies and Employment

Reports on the employment situation in the electronics industry are rather mixed. The informed view is that overall employment levels in the industry is being maintained. Some major companies are expanding but there have been redundancies and even closures in other companies. A particularly welcome development is the announcement by I.B.M. to set up a software house in Dublin. Digital Equipment Corporation, Wang Computers, Apple Computers, North Star Computers, Northern Telecom, Memorex, Hyster and Verbatim are among the multi-national companies which have expanded their workforce in Ireland over the past six months. There has been a number of announcements of proposed industrial projects in the new technology/electronics sector but not sufficient time has elapsed to judge the viability of these projects. Unfortunately Telectron, one of the few Irish indigeneous companies with relatively well developed R & D capabilities has ceased operations at its main plant despite being one of the major contractors in the development of the telecommunications systems in Ireland.

3.9.2 Education and Training

The employment situation in the electronics sector and in industry generally has resulted in lower than expected demand for the increased output of engineers from University Colleges, Colleges of Technology and National Institutes of Higher Education. This is very much in contrast with the situation which obtained in 1979 when industry was lobbying for a very substantial increase in output of engineers and technicians. This increase came as a result of an initiative by the Government acting on the advice of the Manpower Consultative Committee. However, the Industrial Development Authority claim that a surplus of engineers and technicians is a positive attraction for high technology industrialists to locate in Ireland. Nevertheless, some University Authorities are beginning to question the wisdom of expanding the engineering faculties at a time of general cut backs in expenditure on higher education. Last year the unemployment level among recently graduated engineers (at 12 % six months after graduation) was the subject of unfavourable comment and the situation is expected to worser further this year with increased output and stable if not lower demand. Despite this less than satisfactory demand for young qualified engineers and technicians, the demand for places at entry to engineering and technical courses is high and not all aspiring entrants obtain admission to the course of their choice.

For example, in one of the Colleges there is a four fold over subscription of candidates for available places in electronic engineering. This generally leads to a high slected, well qualified and a high ability group of engineering students. Staff resources in the engineering faculties are under pressure as not all posts sought under the Manpower Programme, initiated by the Government in 1979 have been sanctioned due to the Government cut backs in the filling of new posts and vacancies in existing posts. Some of the equipment in the older faculties of engineering is very much out of date.

In an effort to assist recently graduated engineers and technicians to obtain experience, the Youth Employment Agency in association with the Institute for Industrial Research and Standards and the National Board for Science and Technology developed a scheme in November 1982 to subsidise the employment of these graduates by small industry. The objectives behind the scheme were two-fold. In the first instance there was the question of breaking the "experienced only need apply" syndrom of some Irish companies for the selected young unemployed graduates and secondly there was the additional welcome input of young technological talent into the thinking of small companies, many of which would not have hired a graduate previously. Despite the best efforts of all concerned there was some difficulty in filling the quota (80) of placing young graduates with suitable firms even though the wage costs to the company concerned would be about 60 % of open market costs.
A decision is yet to be made if this scheme will be in operation for this year's group of graduates.

The programme of putting microcomputers into second level schools has slowed down due to the Government cut backs in education. Nearly two third of second level schools have computer facilities. There have been a few initiatives by computer companies in providing computer services for second level schools in selected areas. The Fine Gael/Labour Programme for Government stated that there was a long-term intention to give computer facilities to primary schools. To date very few such schools have computers, either for teaching or administration. The Department of Education has standardised on Comol - a structural programming language for the teaching and examining of computer programming in second level schools. Students who take this subject in the senior cycle of the second level curriculum obtain a certificate of proviciency if their performance reaches a certain standard. Over one third of second level schools offer this subject.

AnCO - the Industrial Training Authority are currently planning for the opening of two training centres for the training of personnel in such areas as CAD/CAM, office automation and general computing. A range of mini and micro computer systems and associated software is to be installed in these centres. The Distance Learning Course on Computers and Basic Programming, organised by the National Institute for Higher Education, Dublin was a major success and about 800 students have finished the course. This course which inaugurated distance learning teaching in Ireland was well over subscribed. Of those admitted to the course 25 % were engineers or technologists. 15 % were teachers and 10 % were owners or managers in business. This indicates that there is an interest in new technology in Ireland across a broad band of occupations. The course, which was part sponsored by firms in the industrial sector, was organised on a regional basis and all participants had access to hands-on microcomputer experience. It is hoped to repeat the course in Autumn 1983 and to run more advanced courses in the future. The national radio and television broadcasting service, Radio Telefis Eireann has broadcast a number of public education/awareness programmes concerned with the different aspects of new technology. AnCO - The Industrial Training Authority are currently developing computer aided training packages for programmed learning in the different functional areas of management designed especially with the needs of owner/managers of small industry in mind.

3.9.3 Research, Development and Industry

Irish companies and research institutions were not involved to any great extent in the groups of companies and institutions which were awarded contracts under the first phase of the ESPRIT programme. This was a bitter disappointment to the Irish authorities but perhaps it is a true reflection of the current level of R & D work in new technology in Ireland. However, the I.D.A. report that there is a significant increase in R & D industrial based proposals compared to last year. Some of these proposals would involve a single R & D study in a firm but there have also been a number of proposals to set up permanent R & D facilities, particularly in the electronics sector.

The Minister for Industry and Energy is to publish a White Paper on industrial Policy by Autumn 1983. It is expected to give a clear exposition of the Government's position in regard to the Telesis Report published last year on "A Review of Industrial Policy" which contained a number of adverse comments on the industrial development policies adopted by the successive Irish Governments, including those ralating to the new technology area.

The Telesis Report was somewhat critical of the operations of the Industrial Development Authority, the main agency of the Government in industrial development. As far as the electronics industry was concerned the Telesis Report was of the opinion that the industry in Ireland tended to be mainly concerned with manufacturing and less so with the other functions of a "total business" viz. R & D and marketing. Telesis goes on to argue that without R & D and marketing self sustaining and secure growth of employment and output of the industry are unlikely.

In conjunction with their general European marketing strategy a number of the major microcomputers companies have started distributing their products in Ireland. One of the national newspapers carries a computer section on a regular basis. A new Irish magazine devoted to microcomputers has started publication.

The programme of demonstration/information seminars conducted by the Microelectronic Group within the Institute of Industrial Research and Standards have been well attended and appears to have succeeded in making industry aware of the benefits to be derived from the use of new technology not only for data processing and telecommunications but also for the monitoring and control of production.

The Postal and Telecommunications Services Bill 1983 is currently going through the Dail (Parliament). This Bill covers the transfer of the postal and telecommunications services from the civil service to the public service. It is proposed to set up two semi-state bodies. An Post for the postal services and the Bord Telecom Eireann for the telecommunications service. Some 30 000 civil servants will be transferred to the two new bodies.

3.9.4 Industrial Relations

On the industrial relations front, the only significant matter of interest, as far as new technology is concerned, is that the dispute in the banks in regard to the use of cash dispensing machines has been settled. A comprehensive agreement covering the introduction and use of new technology over a five year period in the banks was signed. The Labour Court in it's ruling on the case recommended that both sides consider job enrichment and career structures as well as cash payments in future negotiations regarding new technology.

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